Y2K countdown **Y2K WORK TO DO** Many server operating systems require Y2K upgrades or patches. **Page 14.**

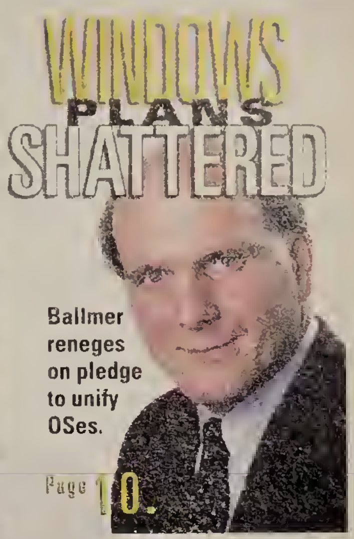
KEEPING SECURITY COOL Intrusion-detection start-up Network Ice is launched by ex-Network Associates exec Greg Gilliom. **Page 8.**

The newsweekly of enterprise network computing

NetworkWorld

April 12, 1999 Volume 16, Number 15

The network portal: www.nwfusion.com



WINDOWS PLANS SHATTERED

Ballmer reneges on pledge to unify OSes.

Page 10.

Inside

SHAWN HENRY

WEATHERING A MARKET STORM: After some highly public failures, network pros like Fidelity's Joe Bai are shoring up their nets to cope with the onslaught of e-traders. What they've learned can help you provide ironclad protection for your net. **Page 41.**

DIGITAL DOUGH FAILS TO RISE: There's no need for electronic currency on the 'Net when customers are willing to pay with plain old plastic. **Page 47.**

HAVING TROUBLE RESPONDING TO CUSTOMER E-MAIL? Our review shows that Mustang's Internet Message Center tops two competitors for the automated handling of incoming e-mail. **Page 49.**

3Com to span Ethernet, ATM nets with QoS

BY JIM DUFFY

MARLBOROUGH, MASS. — If 3Com is successful in its next ASIC endeavor, users can expect to get consistent quality of service (QoS) for applications running between Ethernet and ATM networks.

3Com plans to bolster its CoreBuilder and SuperStack switches with new Application Specific Integrated Circuits (ASIC). The processors are designed to ensure seamless QoS among Ethernet end stations connected over an ATM backbone.

Maintaining QoS integrity across networks based on the same media is challenging enough, let alone enforcing QoS across different nets, analysts say.

See **QoS**, page 61

Lucent arms for campus assault

Low-cost routing switches aimed at Cisco, Nortel.

BY DAVID ROHDE AND JEFF CARUSO

CONCORD, MASS. — Lucent this year is expected to overhaul its campus switching family with devices aimed squarely at rivals such as Cisco, Nortel Networks and 3Com.

Lucent is planning two routing switches — the campus Cajun P660 and backbone P880 — that will give customers greater port density, Gigabit Ethernet support, quality-of-service (QoS) control and lower per-port prices, especially on 10/100M bit/sec connections, according to users briefed on the plans.

Lucent declined to comment on impending announcements, but users say they've been told the 17-slot P880 features 24-port Ethernet switch cards for a

See **Lucent**, page 64

More Online

- Tech specs on existing gear mentioned in this story.
- An archive of our e-mail newsletter on high-speed LANs.

FIND IT DocFinder 2458 ON FUSION

www.nwfusion.com

RBOCs prep speedy new transparent LAN services

BY TIM GREENE

Carriers soon will offer Gigabit Ethernet wide-area services so fast that users at sites miles apart will think their desktops are connected to the same LAN.

Ameritech plans to introduce such a package by mid-year as part of its existing LAN Interconnect Service. Bell Atlantic, BellSouth and SBC Communications are also looking to offer Gigabit Ethernet wide-area links, but they have no delivery timetable.

In addition to boosting speed, Ameritech's services simplify the WAN for network executives because the carrier installs all the necessary hardware, including LAN ports, at the customers' sites. All customers have to do is plug in

See **LAN**, page 62

900

George Lucas a threat to your net?

BY PAUL MCNAMARA

May the force be with your e-mail administrator.

As if that gyrating dancing baby and a steady stream of holiday e-cards weren't enough, network professionals have another potential problem on their hands in the form of downloadable movie trailers for *Star Wars: Episode I The Phantom Menace*.

Forget the title: There's nothing phantom about this menace. The film won't be in theaters until next month, but variations of the trailers are already circulating via e-mail attachments. Weighing in at an eye-popping 11M to 25M bytes, these two-and-half-minute QuickTime clips will chew up more bandwidth and disk space

See **Star Wars**, page 61

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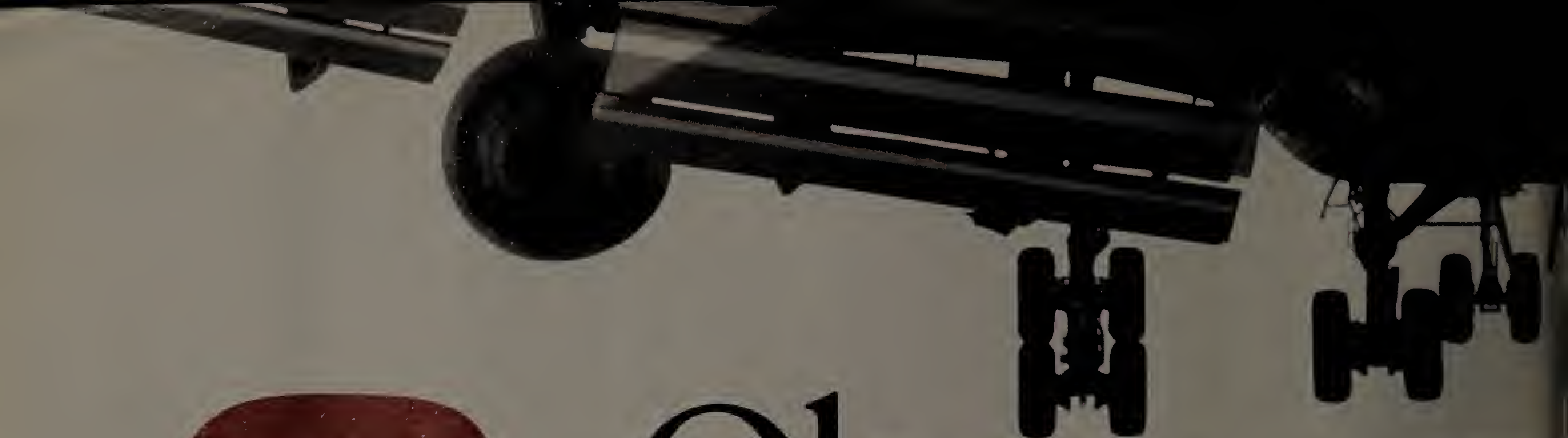
As anxious moviegoers start queuing up for tickets to *Star Wars: Episode 1 The Phantom Menace,* e-mail administrators are concerned that downloadable copies of the film's trailers will clog corporate e-mail queues.

Newspaper $5.00



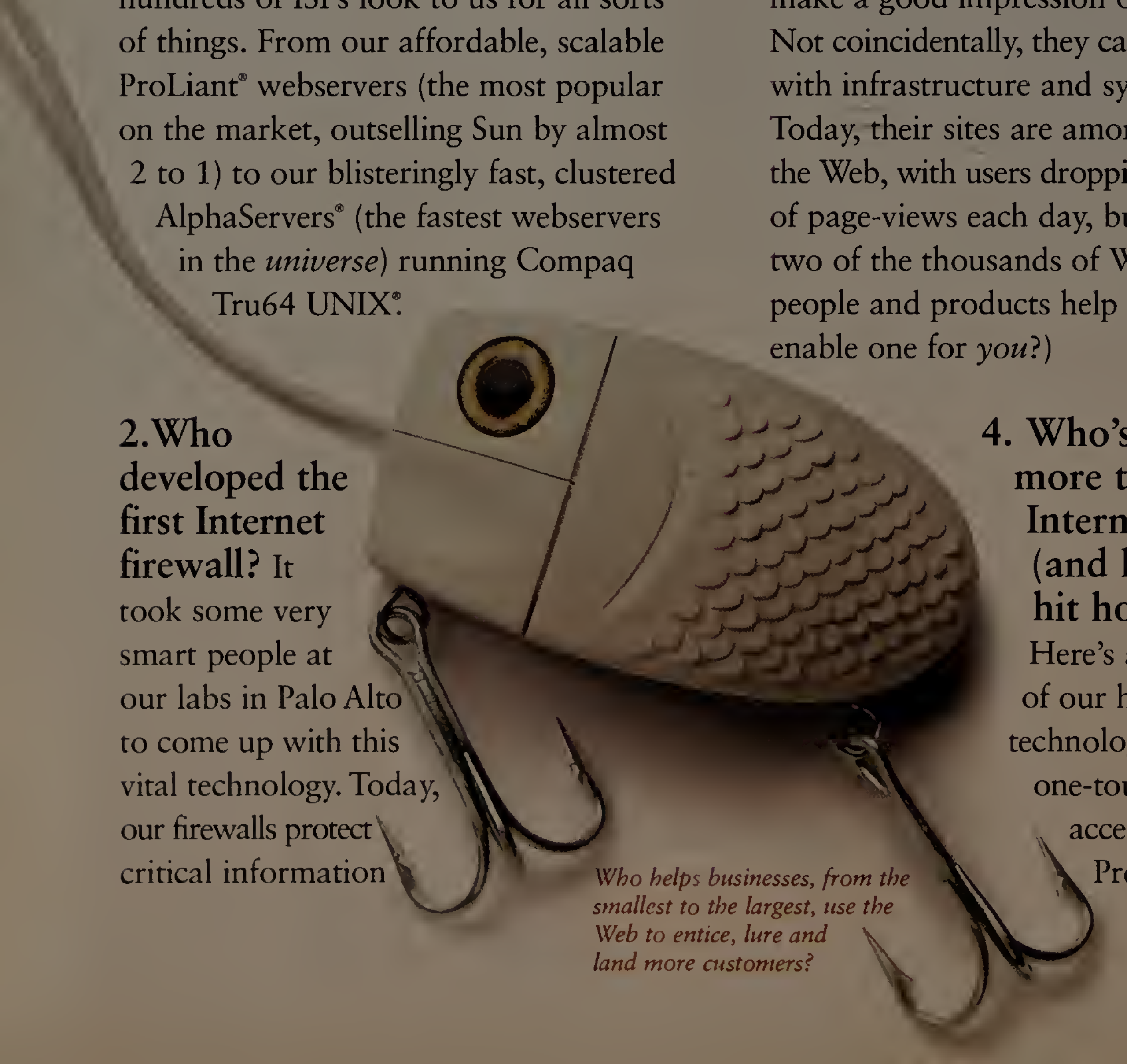
Okay every
ready
Inte

We know that you know a *lot* about the Internet. But if you find yourself stumped by the following questions, it's possible there are still a few things about the 'Net that you *didn't* know. Care to find out? Then let's get started.

1. Who provides for the Internet Service Providers? For six out of the eight largest ISPs, it's Compaq. Fact is, hundreds of ISPs look to us for all sorts of things. From our affordable, scalable ProLiant® webservers (the most popular on the market, outselling Sun by almost 2 to 1) to our blisteringly fast, clustered AlphaServers® (the fastest webservers in the *universe*) running Compaq Tru64 UNIX®.

2. Who developed the first Internet firewall? It took some very smart people at our labs in Palo Alto to come up with this vital technology. Today, our firewalls protect critical information in thousands of businesses and government agencies. Our firewall technologies make it possible for you to safely connect your private network to the Internet, and enable you to turn the coldest of shoulders to vandals and thieves, while extending the warmest of welcomes to employees and customers.

3. Who helps MSN.com™ and barnesandnoble.com have an Internet presence worthy of Microsoft and Barnes & Noble? These companies know how crucial it is to make a good impression on the Internet. Not coincidentally, they came to us for help with infrastructure and systems support. Today, their sites are among the busiest on the Web, with users dropping in for millions of page-views each day, but they're just two of the thousands of Web sites that our people and products help enable. (Can we enable one for *you*?)



Who helps businesses, from the smallest to the largest, use the Web to entice, lure and land more customers?

4. Who's doing more to help the Internet really (and literally) hit home? We are. Here's a small sample of our home Internet technologies: simple, one-touch Internet access; affordable Presario® PCs that you can order broadband-ready, for ultra-fast access many times that of conventional 56K modems; and easy home networking solutions that let you connect multiple PCs using existing pho lines, and allow multiple users to access the Internet at the same time.

5. Who's using the Web to get more, much more, out of ATMs? With Compaq's NonStop® mission-critica systems and solutions behind almost two thirds of the world's ATM machines, wh more is there to get? Well, how about airline tickets. Postage stamps. Virtually every kind of financial transaction. And more. In the near future, Compaq's Web-enabled ATM technologies, developed in partnership with CIBC, will dramatically expand your notion of what you can get out of an ATM machine.

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Who helps the leading aerospace companies use the Internet to take their businesses to new heights?

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or the first annual
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Which single button on a computer keyboard, and from which company, has introduced more people to the Internet than any other?

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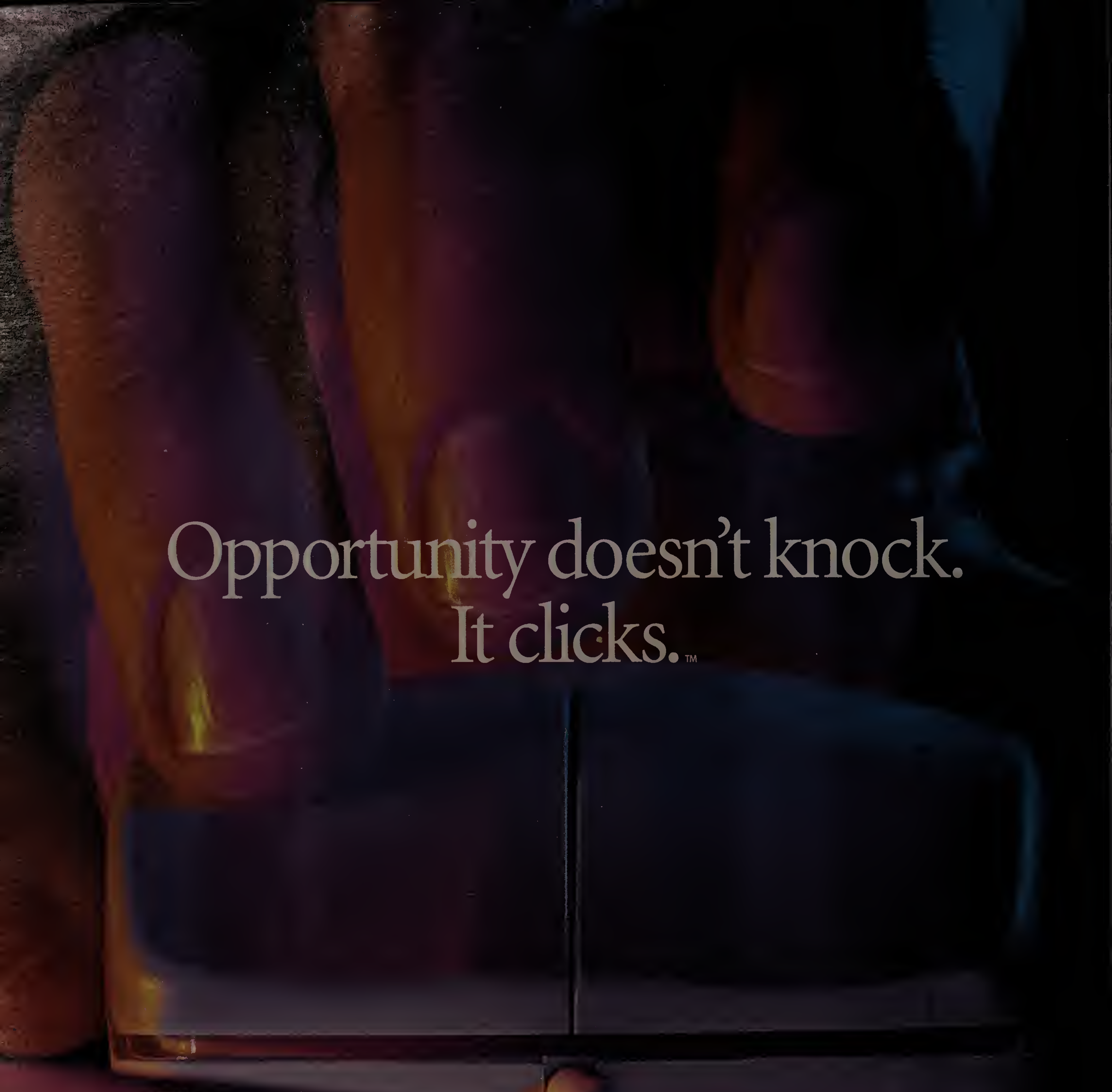

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THIS WEEK ONLINE

You snooze, you lose? Our article last week on sleep-deprived IT workers woke some folks up. Writes one: "There's a macho ethic at work in IT regarding the need to sleep. . . . I found a safe place to snooze on the cold floor behind a system with a noisy fan that masked my noisy snoring." What do you think? Jump into our (not so) sleepy forum. **DocFinder: 2464**

Plastics. What do you do with all those 486s? In Water Cooler this week, Managing Features Editor Amy Schurr looks at some innovative ways companies are recycling used computers. **DocFinder: 2464**

Career Doctor. This week, kindly Career Doc Shaun Kelly discusses what to do when a company calls you for an interview: How do you find out more about the company and get ready for your interview? **DocFinder: 2463**

Keeping Current. Intel seems serious about moving network products into the home, which would give new meaning to the slogan "Intel Inside." Fred McClimans looks at the ramifications of the move. **DocFinder: 2468**

Online communities. Netscape recently shuttered its NetCenter forums. And Salon last week bought the WELL, a pioneering online community. But what exactly is an online community, and how should they work? **DocFinder: 2465**

Background information. Looking for background information on a network vendor? Our Industry/Stocks page has links to everything from product news to stock quotes on dozens of vendors. **DocFinder: 2466**

How to get onto Network World Fusion

Click on Register on the home page and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Nonsubscribers must fill out an online registration form.

NetworkWorld

APRIL 12, 1999

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INTEL'S NET THRUST

Intel's decision to sell network equipment pays off. Page 20.

HOW TO CONTACT US

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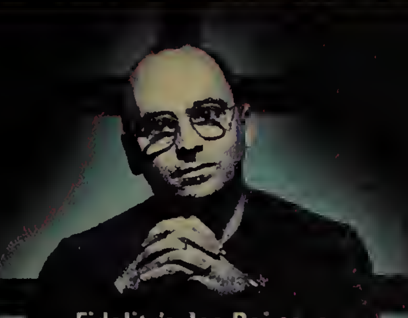
FEATURES

Weathering a storm market

In the wake of some highly public failures, online brokerages are shoring up their nets to cope with the onslaught of e-traders. Page 41.



Fidelity's Joe Bai says availability is the company's top differentiator online.

DIGITAL DOUGH FAILS TO RISE: There's no need for electronic currency on the 'Net when customers are willing to pay with plain old plastic. **Page 47.**

REVIEW: Mustang's Internet Message Center tops two competitors for the automated handling of incoming e-mail. **Page 49.**

NEWS BRIEFS, APRIL 12, 1999

Can't believe everything you read on the 'Net

Ah, that white-collar fraud. PairGain's stock soared 30% after someone posted a bogus news story on the Internet claiming the company was to be acquired by rival ECI Telecom for more than $1 billion. The perpetrator announced the bogus deal via a personal Web site that imitated the Bloomberg News financial site. The report spread to a Yahoo message board, and from there, the story took on a life of its own. Bloomberg News, PairGain and ECI say they had nothing to do with the story, which the perpetrator may have used to boost PairGain's stock price in an effort to unload shares at a premium. Federal regulators are looking into the incident.

Cisco eyes carriers for purchase

Cisco last week announced it would acquire privately held Fibex Systems of Petaluma, Calif., and Sentient Networks of Milpitas, Calif., for a total of $445 million. Cisco plans to use the acquired technology to help service providers accelerate their migrations from circuit-based networks to cell- and packet-based networks. Fibex develops devices that combine traditional voice services with data services using ATM as the underlying technology. Sentient has built a high-density gateway that can transport circuit-based private-line services across packet-based ATM networks.

PCs for potholes

Don't throw out that old PC — it can help fill in those pesky pot holes! The Commonwealth of Massachusetts, in partnership with the American Plastics Council, is promoting a plan to recycle old plastic computer parts to help fill in the state's many potholes. The plastic can be recycled into an asphalt-like mixture for use on roadways, according to the Massachusetts Department of Environmental Protection. Conigliaro Industries of Framingham, Mass., developed the process for converting the plastic into road filler. Company founder Greg Conigliaro says his company handles 50,000 pounds of mixed plastics per day. "We like to say we are paving the highways with the information superhighway," he says.

For more on this topic, visit www.nwfusion.com and go to DocFinder 2464.

The Gore-y details

Al Gore's feet have spent more time in his mouth lately than on the ground. Following last month's much-ridiculed claim that he invented the Internet, the vice president last week made two big gaffes on his Web site. First, he debuted a "just-for-kids" section that asked youngsters for their names, e-mail addresses and ZIP codes. The problem is that federal privacy-protection laws — laws that Gore championed — will soon prohibit commercial sites from collecting and storing that kind of information about children without parents' permission. Gore campaign workers quickly pulled the queries from www.algore2000.com.

Then the vice president had cybergeeks scratching their heads by proclaiming his site to be "open source." He even asked visitors to contribute code to enhance the site. However, "open source" is the term traditionally used to describe the free distribution of software code. Most Web page source code is already open and can be viewed with the click of a browser button.

Breaker, breaker: got a picture-taker at Milepost 66

Usually speed and the 'Net are mutually exclusive. Not so for a new Web site called speedtrap.com that identifies speed traps across the country. The site, which lets visitors post locations where they have received speeding tickets, attracts about 250,000 people daily. Speedtrap.com includes information about the type of speed-measuring technology used; average cost of a speeding ticket, types of law enforcement vehicles; and scanner frequency. Texas has the most postings, while Rhode Island, Alaska and the Dakotas bring up the rear.

HP buys fax-over-IP testing tools

Hewlett-Packard's Test and Measurement Division last week said it has acquired Telegra, a Santa Clara, Calif., developer of facsimile protocol testing systems and equipment. Telegra's products test and verify IP fax servers and will fit in with HP's voice-over-IP testing and measurement systems. About 15 employees from Telegra are expected to join HP.

New Linux server targets e-comm

Penguin Computing last week announced an eight-way symmetric multiprocessing server for Linux designed to handle large databases and e-commerce functions. The Penguin Linux 8000 server starts at $100,000 and is available through the Penguin Web site at www.penguincomputing.com. Penguin uses a modified version of Red Hat Software's Linux 5.2.

Java security hole is slow to close

BY ELLEN MESSMER

Although Sun and America Online's Netscape were told one month ago about a serious Java security flaw within their browsers, the fix isn't complete.

The security flaw, uncovered by a German graduate student in early March and confirmed by two leading Java security experts, allows an attacker to launch a hostile applet from a Web site that completely overrides the Java security controls in the victim's browser. When this happens, the attacker can take over the victim's computer, deleting files or installing a Trojan horse program such as Back Orifice, a tool built by the Cult of the Dead Cow.

Ironically, Microsoft's Java browser is not vulnerable to this attack, apparently because its implementation of the Java Virtual Machine is different from the JVM standard set by Sun.

But Sun's HotJava Browser and Netscape's Navigator and Communicator browsers can be tricked into surrendering their security controls. The two companies have not completely plugged the holes.

Netscape has set no specific date by which to fix the problem. Instead, Netscape is telling users to disable the Java functionality in its browser and groupware clients.

As the progenitor of Java, Sun seems most concerned about the flaw, known informally as the Sohr Java Vulnerability. The flaw is named for Karsten Sohr, the University of Marburg graduate student who discovered it.

Sun's JavaSoft division has a fix for the Java Development Kit (JDK) Versions 1.1, 1.8 and 2.0. The company is in the process of producing patches for JDK 1.1.6 and 1.1.7, says Maxine Erlund, senior engineering manager for Java security and networking at JavaSoft. Everyone using Sun's browser should download the fix for the JDK version they are using.

Custom-designed Java client software would also be vulnerable to the security flaw, and Sun recommends that anyone with custom Java software on their desktops recompile their code with the fixed JDK.

Java experts who have examined the way the Sohr Java Vulnerability works say it's serious. Though no one wants to give hackers precise details, Java expert Gary McGraw, vice president of Reliable Software Technologies, says the flaw confuses the virtual machine and the confusion allows the hostile Java applet to override the security policy in the browser.

"Once you sneak past the verifier, you can do anything at all," he says. Ed Felten, Princeton University professor and Java expert, confirms the problem: "When Karsten Sohr contacted us last month and asked for our help in reporting this to Sun, we verified what he discovered." Through the Sohr exploit, "you can delete files, monitor or capture private data or subject it to a computer virus," Felten explains.

Those who have seen it think the Sohr exploit is arcane enough that few others will figure it out. In other words, they're hoping Karsten Sohr keeps mum. ◪

What is your Java and ActiveX security policy?

Of 300 companies surveyed, about one in four had a Java and/or ActiveX security policy. Below are the percentages of those companies with policies that agreed with a series of statements.

Allow trusted Java applets	21%	Allow signed ActiveX controls	14%
Allow untrusted Java applets	18%	Allow unsigned ActiveX controls	9%
Do not allow Java applets	33%	Do not allow ActiveX controls	39%

SOURCE: INTERNATIONAL COMPUTER SECURITY ASSOCIATION, CARLISLE, PA.

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DNS Discovery	✓	
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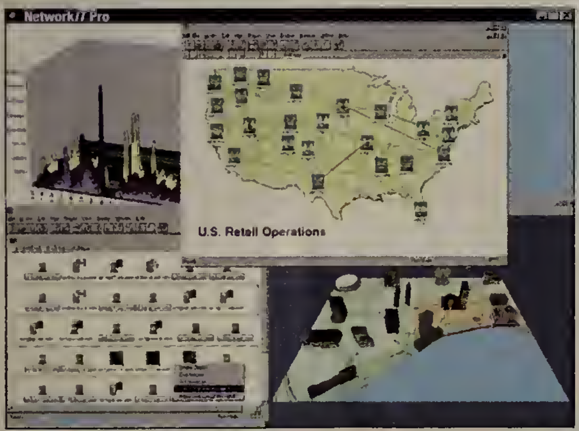

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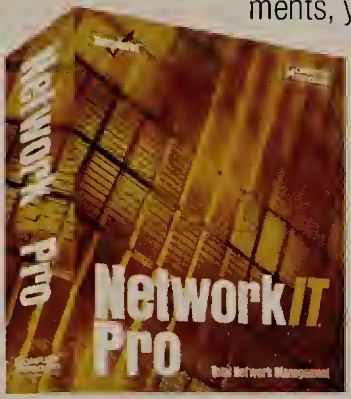

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Oracle to ease data exchange via XML

New software will serve as a clearinghouse for XML interactions to make data exchanges easier.

BY JOHN COX

Oracle this week will announce messaging software that uses Extensible Markup Language (XML) to let Web applications share data.

The new middleware, called Oracle Message Broker, could make it easier for companies to swap manufacturing schedules, inventories, orders and bills between intranets.

The company will introduce the software at Spring Internet World '99 in Los Angeles.

Message Broker uses XML, which is intended to replace HTML for formatting Web documents. HTML only displays text information and numbers on a Web document. By contrast, XML lets computer programs actually work with the document's data.

In addition, XML lets Web designers easily create documents tailored for the information needs of specific groups, such as truck manufacturers and clothing retailers.

Message Broker will be a clearinghouse for XML interactions, according to Oracle. Web applications will send out XML messages to Message Broker, which will then route the messages to the receiving applications. In doing so, Message Broker will modify or adapt the XML data for the recipient.

These capabilities may help Oracle set Message Broker apart from traditional messaging middleware products, such as IBM's MQ Series, which today handles XML as just one more file format, says Kevin Dick, an industry analyst in Palo Alto.

HTTP is not a reliable protocol for transaction systems, Dick says. Using a messaging system such as Oracle's may be a better way to ensure the safe exchange of Internet applications, he says.

Although Message Broker can use the Oracle8i database to store messages temporarily in case of a server or net outage, the database is not required to use Message Broker. Oracle8i became the company's first product to support XML when the software began shipping in February.

A critical issue for users will be how well Message Broker runs as XML traffic loads increase. Another performance issue is how the software will perform if it interacts with the Oracle database in processing an XML page. Oracle8i has to translate XML into a format that the database can store in rows and columns as a standard relational table.

Also at Internet World, Oracle will announce a new version of its Oracle Application Server, which runs Web applications and links them with back-end databases.

Application Server 4.0.8 adds support for the latest Enterprise JavaBeans specification, which lets companies reuse server-based Java components.

The upgraded server software will also be able to run Java servlets. These are Java programs that process information on a server and then create an HTML page to deliver the results to a browser.

Later this year, Application Server will be linked with both Oracle Enterprise Manager, which is used to monitor Oracle software products, and the upcoming Oracle Internet Directory.

In addition, Oracle plans to release a stripped-down version of Application Server to let customers quickly deploy simple Web applications. ◪

Oracle Message Broker

The skinny on Oracle's XML management product:

- Server software routes XML messages among intranet applications.
- Transforms data as needed to match format of recipient.
- Message queues ensure later delivery if network or server fails.
- Available latter half of 1999.
- Price to be announced.

Network Ice to put the freeze on hackers

BY ELLEN MESSMER

SAN MATEO, CALIF. — Network Associates will soon have some new competition for intrusion-detection business. Three engineers who left the software giant last year founded a new company, Network Ice Corp., with a fresh take on intrusion detection.

The Network Ice founders, Greg Gilliom, Robert Graham and Clinton Lum, will unveil their intrusion-detection wares at the NetWorld+Interop conference next month. Their anti-hacker product suite is designed to protect Windows desktops and corporate servers from intruders attacking from outside the firewall or from within the corporate LAN.

"We can stop them cold," claims Gilliom, president and CEO of Network Ice.

The Network Ice software runs on all varieties of Windows and Unix machines and is designed to detect the first signs of a hacker intrusion, such as someone trying to run port scans or using the Back Orifice Trojan horse. Created by hacker group Cult of the Dead Cow, Back Orifice lets a hacker take complete control of a Windows-based desktop.

Network Ice's software cuts off the intruder's IP address when the software senses trouble. But just blocking the same address for hours isn't a complete answer because IP addresses are often dynamically assigned by the ISP, Gilliom points out. Instead, the Network Ice software will later re-enable the IP address, still watching for trouble.

Gilliom says his new product will stay ahead of hackers.

Gilliom says his company's intrusion-detection software will be at least as fast as competing products, such as those from Internet Security Systems or Network Associates.

"We can do 600,000 frames per second of analysis; we can do 100% load on an Ethernet line," he says.

The Network Ice software is designed not to respond at all to inappropriate inquiries, such as operating systems fingerprinting because these responses offer clues as to what operating system or services are running.

The three Network Ice founders, who fashion themselves as nerds building the next big thing, together bring an impressive level of security expertise to their start-up.

Gilliom was chief technology officer at Network General, which merged with McAfee Associates to form Network Associates. His partners, Graham and Lum, were engineers at Network General. ◪

Be a
Net Know-It-All
For the answer to this week's question and more net trivia, visit Network World Fusion and enter 2467 in the DocFinder box.
This week's question:
Former MCI President and COO Daniel Akerson is now CEO of which company?

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MCI WorldCom: Wireless wannabe

BY DENISE PAPPALARDO

JACKSON, MISS. — Bernard Ebbers, the colorful CEO of MCI WorldCom, has made it his business to acquire his way into the local and long-distance service, data service and Internet markets. And it looks as though wireless may be next.

That's why rumors were swirling last week that MCI WorldCom would be acquiring Nextel Communications, a wireless service provider in McLean, Va.

It seems that MCI WorldCom wants to make a wireless splash and compete with chief rivals AT&T and Sprint, and local carrier Bell Atlantic, which all have strong wireless arsenals (see graphic).

Wireless services is a gaping hole in MCI WorldCom's product portfolio that can be filled in a few ways, says Lisa Pierce, an analyst at Giga Information Group, a Cambridge, Mass., consulting firm. "[Ebbers] can build or buy, and buying makes the most sense right now," she says.

Earlier this year MCI WorldCom had a chance to acquire AirTouch Communications, but it backed off. AirTouch was eventually acquired by Vodafone for $56 billion. Nextel is valued at $7 billion to $11 billion, quite a bargain compared with AirTouch.

But buying Nextel isn't going to give MCI WorldCom everything it needs. Nextel's specialized mobile radio network uses Motorola's proprietary iDEN wireless digital equipment, which only supports voice traffic. Like most networks, Nextel's can be upgraded to support data traffic, but those upgrades may not be as easy as MCI WorldCom would like. Any company that acquires Nextel will have to worry about keeping iDEN experts on staff after the acquisition not only to maintain the network but also to upgrade it.

"If your network is based on a standard such as Code Division Multiple Access, then you can just hire CDMA experts, but that's not easy when your network is proprietary," Pierce says.

Nextel also recently sold its interest in Local Multipoint Distribution Service (LMDS) licenses to Nextlink, further diminishing Nextel's value as a wireless data vendor. LMDS is a fixed wireless local loop technology that can support high-speed data traffic.

At least one customer wants to see MCI WorldCom buy a vendor that could provide a more integrated data and wireless voice service.

"Everyone has a cell phone, we're more concerned about using a nationwide wireless data service that would interconnect to our virtual private network," says Jim Fey, director of strategic technology for PMI Mortgage Insurance, an MCI WorldCom frame relay service customer. Buying all these services from one provider would hopefully lead to more discounts, he says.

MCI WorldCom can also try to get into the wireless business by buying regional personal communications services carriers such as Omnipoint and Ariel, Pierce says. The vendors would provide MCI WorldCom with relatively new networks, a customer base and the ability to more easily get into wireless data services. But there would be a price to pay for those acquisitions: MCI WorldCom would have to interconnect multiple networks, which could be time-consuming and difficult. ◪

Wireless leaders

What MCI WorldCom is up against in its attempt to enter the wireless communications market:

AT&T Wireless		**Bell Atlantic Mobile**		**Sprint PCS**	
Customers:	10 million	Customers:	6.2 million	Customers:	2.59 million
1998 revenue:	$4.5 billion	1998 revenue:	$3.5 billion	1998 revenue:	$1.2 billion
Network:	TDMA cellular	Network:	CDMA, digital and analog	Network:	CDMA PCS network

Ambitious Windows plan comes crashing down

Microsoft extends the life of its Windows 9X line, bags common Windows 2000 plan.

BY CHRISTINE BURNS

LOS ANGELES — For years Microsoft has been telling the world that the future of the PC lies with NT. That future just moved back a few years as Microsoft delayed plans to combine its Windows 9X and NT Workstation code bases into a one-size-fits-all operating system.

Last week Microsoft also hinted at an open source Windows future and demonstrated a 64-bit revision of NT.

The company would still prefer that the desktop world move lock, stock and keyboard to NT. Unfortunately Microsoft has been unable to make NT easy enough for consumers to manage or efficient enough on low-end systems.

The company will still merge the code bases — sometime within a decade.

Microsoft President Steve Ballmer announced this alteration in the Windows roadmap at the Windows Hardware Engineering Conference here.

Who cares about Win 98?

Company officials contend this change in the Windows roadmap will affect only consumers because the more stable and secure NT Workstation is a better bet than Windows 9X for corporate desktops. But not everyone is listening. Many corporations haven't moved to NT because it can't run DOS applications or because the hardware that NT requires is too inexpensive.

Microsoft wanted Windows 98 to be the end of the 9X line and planned to replace it with the yet-to-be released Windows 2000 Professional Edition. This desktop operating system would have shared 36 million lines of code with the Windows 2000 Advance Server and Data Center editions.

Microsoft President Ballmer touts Windows 9X future.

Ballmer admitted his company could not deliver an edition of Windows 2000 that was scaled-down enough to fill consumer market demands. "We will get there eventually," Ballmer told attendees. "But we've decided to do the things that we all need to do to simplify the Windows experience."

Therefore, the company will deliver a Windows 98 upgrade sometime next year. That release will include universal plug-and-play networking and features that will make it easier for users to connect to the Internet and work online. The release will be different from the minor Windows 98 refresh — called Windows98 StepUp — that is in beta now and will be shipped this fall.

"They realized that force-feeding users the NT code wasn't going to work," says Bill Kannberg, IS manager for Hillsboro County, Fla. Kannberg manages more than 2,000 desktop machines that run a mix of Windows 95 and 98.

To date, he has bucked the pressure to go to NT because the hardware requirements are too high and support costs are steeper on NT because of problems with backward compatibility.

Microsoft couldn't afford to lose the upgrade revenue from customers such as Kannberg who wanted to stay with Windows 9X.

"Thus, the Win98 upgrades were born," Kannberg says.

"We've been saying for a year that Windows 2000 is not the heir apparent to Windows 9X," says Neil Macdonald, an analyst with Gartner Group, a consultancy in Stamford, Conn. Macdonald advises corporations not to embrace Windows 2000 on the desktop until there has been one upgrade or service pack.

At the show, Microsoft officials also hinted that they are considering an open source model for Windows. The company has studied the issue for the past six months and is looking at open source as a way to promote Windows application development, says Brian Valentine, Microsoft vice president.

However, Valentine fell far short of announcing any detailed plans to increase the exposure of Windows source code. Currently, Microsoft gives Windows source code to selected developers who mostly use it to write low-level device drivers and to universities that use it for research.

Microsoft also gave attendees the first public look at its 64-bit version of Windows 2000. During his keynote presentation, Ballmer demonstrated that 64-bit Windows 2000 can return Microsoft SQL Server queries at a rate 30% faster than the 32-bit version of Windows 2000. ◪

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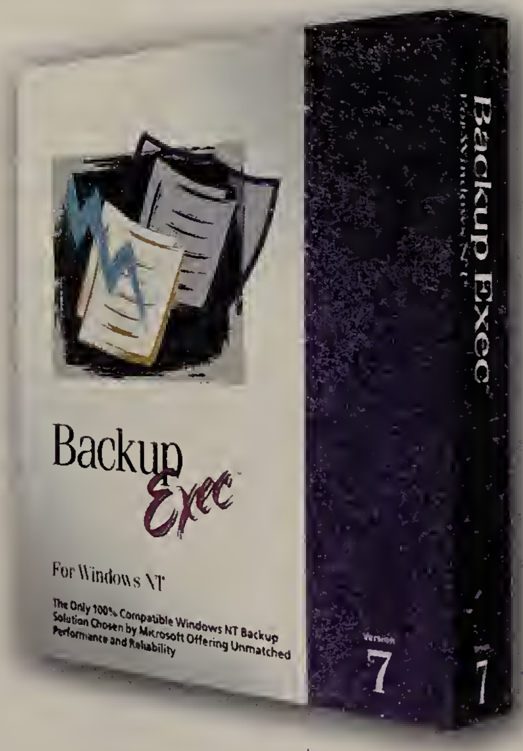
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IBM to revamp server design

RS/6000 SPs to be divided into processing and communications nodes.

BY MARC SONGINI

SOMERS, N.Y. — IBM is drastically redesigning its high-end RS/6000 SP server line so the servers' communications capabilities will match their processing power.

The RS/6000 SP servers are parallel-processing machines that garnered a lot of attention a couple years ago for matching wits against Russian chess master Gary Kasparov.

The SPs, positioned between IBM's midrange- and mainframe-class servers, compete with the likes of Sun's top-of-the-line Enterprise 10000 and Hewlett-Packard's V series Unix machines.

Since the line's introduction five years ago, SPs have typically been used for crunching computing-intensive business and science applications, data mining and more. IBM claims it has shipped about 5,500 systems with a total 55,000 individual nodes.

IBM says the SPs will soon be able to handle up to 10 trillion transactions per second. But with only 10 PCI slots, the machines will need a corresponding boost in I/O capabilities, says Don Grice, IBM's chief engineer for RS/6000 SP development.

The redesign involves literally splitting the SP server into two devices, which can be housed in a single cabinet or separated by a cable running up to 15 meters and supporting transfer speeds of up to 500M bit/sec.

IBM's RS/6000 SP servers will be able to handle up to 10 trillion transactions per second.

One node contains CPUs, cache, memory and five I/O ports. This node handles the server's computational functions. The other node is optimized for communications and features eight PCI slots as well as storage disks.

A CPU node can connect to as many as seven of the communications, or remote I/O nodes, for a total of 61 PCI slots.

"We've been trying to get as many system resources into as small a package as we can, and we wanted to increase the number of I/O ports without expanding the size of the nodes," Grice says.

Lawrence Livermore National Laboratory is among the organizations planning to use IBM's next-generation SP servers, which go by the code name Nighthawk.

The lab will use the servers to conduct nuclear explosion simulations on a network that features FDDI, Gigabit Ethernet and HPPI interfaces, says Mark Seager, assistant head of Livermore's computing department.

Seager is glad to have the added communications capabilities, but he expects balancing the SPs' computing power with the right amount of disk space and network bandwidth will still be a challenge.

"When working with these extremely large delivered rates, careful tuning is required," he says.

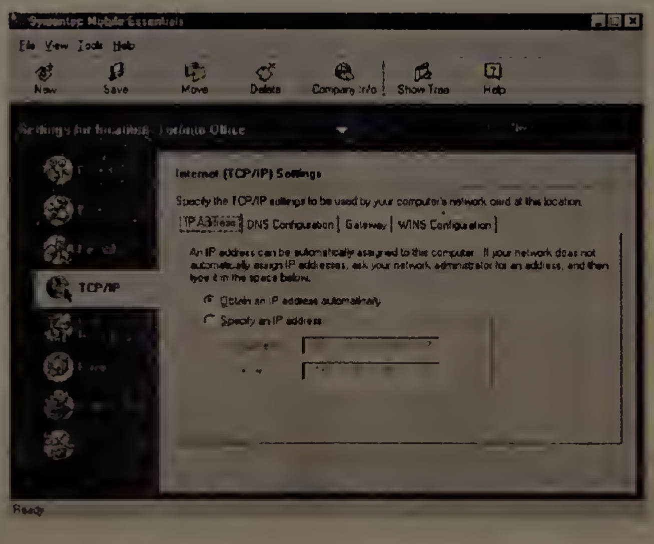
Nighthawk servers based on the new architecture will be available later this year. IBM announced Nighthawk in February.

The company will not announce pricing until closer to the shipment date. ◪

IBM optimizes new RS/6000 model for Web serving. See story, page 13.

QUICKTAKE

Symantec's Mobile Essentials 2.0



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◉ Obtain an IP address automatically

○ Specify an IP address

This June, Symantec will ship Mobile Essentials 2.0, an update of the laptop software that manages dial-up settings, IP address changes, calling card numbers and other configurations.

Mobile Essentials is aimed at the corporate user and includes Windows-based Administrator software that lets a systems administrator create configurations for users. Settings can be transferred to laptops in several ways, including by using an e-mail method that automatically makes adjustments to the Mobile Essentials desktop software, or a server-based update. The software costs $69 per seat, and the beta release is expected to be ready May 15.

Symantec: (408) 253-9600

IBM, Concentric aim to make e-commerce easier

BY DENISE PAPPALARDO

LOS ANGELES — If the thought of designing, launching and managing your company's electronic commerce Web site gives you the cold sweats, hold on to your hanky. ISPs IBM Global Services and Concentric Network will use this week's Spring Internet World '99 conference to roll out services that take these tasks off your hands.

Hosting and design services from ISPs are aimed at companies that don't have the personnel or in-house knowledge to build and run e-commerce Web sites, says David Baltaxe, an analyst at Current Analysis, a Sterling, Va., consulting firm.

Sources close to IBM Global Services say the organization will introduce a collection of services that will include consulting, a variety of e-commerce software packages and back-end systems integration tools for companies starting e-commerce Web sites.

IBM Global Services will consult with customers to help them evaluate their Web sites' goals before diving headfirst into a sea of Internet transactions. The organization will also provide a selection of IBM and non-IBM software that can be used for everything from creating online catalogs to establishing real-time payment authorization systems for business-to-business and business-to-consumer transactions. Among the software offerings will be IBM's Net.Commerce suite.

One source says IBM Global Services will also work with customers to link their e-commerce Web sites to back-end systems, such as databases that store supply-chain information. IBM Global Services is also expected to roll out e-commerce packages for specific vertical markets, such as banking and retail.

The ISP is expected to reveal pricing and availability information this week.

Where IBM Global Services' efforts are aimed more at large companies setting up dedicated Web servers, Concentric's new offering is more for small and mid-size companies that don't mind running their Web sites on shared servers.

However, Concentric's Web hosting offering will support companies that need to sell just a handful of different items online and can settle for delayed invoice processing. The service also targets companies that want to sell hundreds of different products and use real-time credit card authorization schemes.

ConcentricHost service is being offered in conjunction with software from Intershop, CyberCash and Netopia.

Intershop sells software featuring custom templates that make it easier for users to design online catalogs, shopping baskets and product databases. The company's Intershop 3 tools can also help customers monitor inventory and purchasing. PSINet is among the other ISPs already offering e-commerce services in conjunction with Intershop.

Concentric is including CyberCash software to help users set up payment authorization processes on their sites. Netopia's Site Builder software lets users build Web pages without doing any HTML programming themselves.

Concentric is offering its business customers five levels of service, starting with EasySite, which lets users host 15 products with an off-line transaction-processing tool. The top level of service is called Full Store and includes all Intershop 3 options and real-time credit card authorization capabilities.

The services will be available by May for $20 to $266 per month.

Senior Writer Marc Songini contributed to this story.

Online • Daily coverage from Spring Internet World '99.
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Harnessing the Power of Change in the Data Center

IDC
INTERNATIONAL DATA CORPORATION

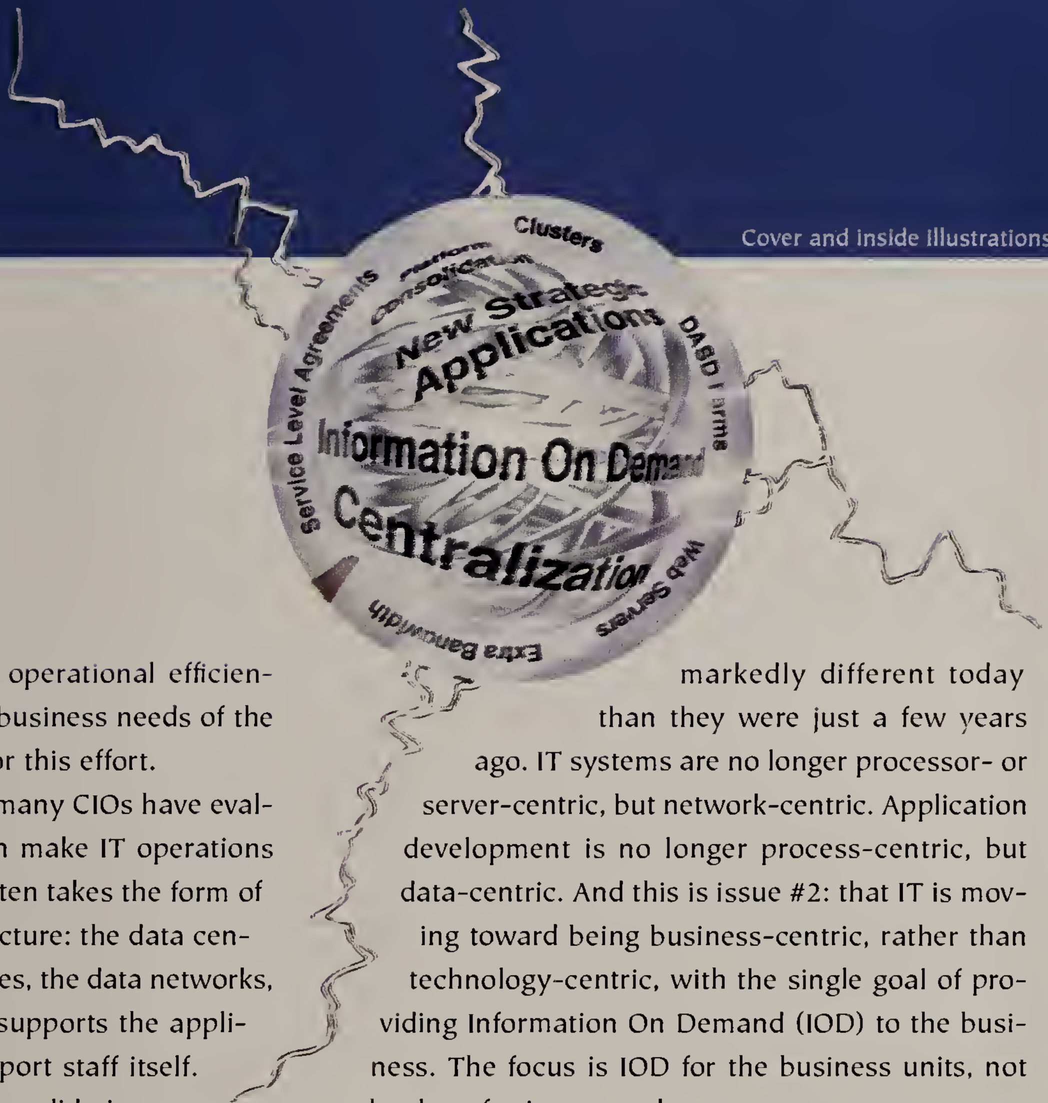
HOW IT WILL CHANGE DATA CENTERS

By Thomas D. Oleson
International Data Corporation

CIOs who achieve excellence in their IT operations usually do so by keeping one eye on enterprise objectives and the other on technology change. Excellence in this instance means applying the best technical solutions for the highest priority business problems.

CEO priorities are what often set a clear agenda for CIOs. As part of its Spring 1998 Global IT Survey, IDC has identified the top two business priorities of CEOs: increasing productivity through improvements in the infrastructure and, within the IT organization, implementing new strategic applications using newer, more efficient technologies. What does all this mean for CIOs? Just this: that the top IT priority has been to improve operational efficiency while aligning the development priorities around new, strategic business applications.

With the conclusion of the two mammoth projects—Year 2000 and the Euro—that have sidetracked IT organizations for months, CIOs will now be able to refocus on adding value to



Cover and inside illustrations by W. Fox

their organizations. Striving for operational efficiencies, in order to better serve the business needs of the enterprise, will be a good start for this effort.

To accomplish this objective, many CIOs have evaluated how new technologies can make IT operations more efficient. This evaluation often takes the form of a review of the entire IT infrastructure: the data centers and their installed technologies, the data networks, the software infrastructure that supports the applications, and the technology support staff itself. Often, the review results in the consolidation of data centers and the adoption of new technologies.

For companies not yet actively engaged in projects to increase IT efficiency through the adoption of new, cost-effective and operationally superior technologies, IDC encourages the formation of a major review effort (a process sometimes referred to as "the reckoning"). No part of the infrastructure should escape this review; CIOs should remember that technology is not an end in itself, but a means to the business ends of an organization. There should be no sacred cows—not the buildings which are the data centers, not the legacy mainframes, not the DASD farms that serve them. Although most data networks are new in design, they too should be subject to review. So should the application and infrastructure software and the IT staff.

There are three issues that should be foremost in the minds of CIOs as they consider whether to consolidate their organizations' information systems. Issue #1: CIOs should realize that technology concepts are markedly different today than they were just a few years ago. IT systems are no longer processor- or server-centric, but network-centric. Application development is no longer process-centric, but data-centric. And this is issue #2: that IT is moving toward being business-centric, rather than technology-centric, with the single goal of providing Information On Demand (IOD) to the business. The focus is IOD for the business units, not technology for its own sake.

IOD means that consumers will be able to access the information they need quickly and reliably, and that they will be able to experience the same dependable access and pervasiveness from IT that they have come to expect from utilities, such as the telephone company or energy providers. With the emergence of IOD, IT will have reached a new plateau in effectiveness, and a new customer-driven relationship between the business units and technology services will have come into being.

Issue #3 is that these emerging concepts are leading to a paradigm shift. Although line-of-business (LOB) departments could manage isolated application servers in the past, they are not as well-positioned to manage the networks of multiple servers, nor the growing complexity of these multiple servers, nor the related storage. In any review of IT's effectiveness, this is an issue that needs to be addressed as early as possible.

The CIO must help LOB executives realize that the

In the major review effort (a process sometimes referred to as "the reckoning"), there should be no sacred cows—not the buildings which are the data centers, not the legacy mainframes, not the DASD farms that serve them.

business units of an enterprise are not prepared to manage shared resources such as network resources, multi-function servers and enterprise data. No matter what the expertise of these executives, they are not capable of dealing with network outages, broadcast storms or incompatible protocols.

What's more, information collected by one department is becoming increasingly vital to other departments. As a result, processes such as the uniform management of data by database packages, its cleansing and storage in data warehouses and data marts, and its sharing across the enterprise, have become services that are the responsibility of the emerging corporate IOD facility—services falling outside the focus and capabilities of LOB managers. Once this understanding is established between the LOB executive and the CIO, the future roles and responsibilities of their respective organizations can be delineated.

Reviewing the possibility of consolidation

Once the political issues surrounding the subject of distributed data centers have been addressed, IT managers should review the possibility of consolidation with respect to all major system components: hardware platforms, storage systems, application software suites, infrastructure software and networks.

For organizations that have multiple data centers, consolidation promises an improved return on investment to the LOB customer by creating a corporate IOD facility with 24x7 service. As the number of midrange and large servers has proliferated over recent years, so have the inefficiencies resulting from underutilization and incompatibilities among operating systems. The opportunity for significant savings in this area is a very substantial one.

At the same time, data storage design is crying out for rethinking and consolidation, as the total cost of ownership (TCO) continues to climb at an unacceptable rate. CIOs should also examine infrastructure and application software, in order to eliminate overlapping products and to reduce the number of suppliers.

Networks are another candidate for consolidation. A good starting point for CIOs is to simplify network design and reduce the number of protocols. At a time when improving productivity is a top business priority, recent advances in telecommunication technologies offer further potential for consolidation (such as blending voice communications over an IP backbone). In short, network consolidation can significantly enhance the delivery of the company's products and services, and can foster IOD by revisiting the efficiencies of centralized, consolidated systems.

The following section will take a quick look at each potential area of consolidation.

Servers can be consolidated in several ways. In its simplest form, consolidation means co-location, that is, bringing a geographically dispersed collection of servers to a single site. Server consolidation can also mean replacing a multitude of smaller servers with fewer, larger machines.

The decision to consolidate is not all or none. In certain settings, there may be real value in establishing "location" centers—glass cupboards that consolidate computing resources at a remote site. A location center can afford better power systems and fewer backup tapes, and, from a management point of view, it can be

Liz Claiborne Inc. Eliminating the Y2K threat

DECEMBER 31, 1999 is a deadline that will not budge. Like many computer systems and software products, several of those used by Liz Claiborne Inc., a designer of fashion apparel and accessories, accept only two-digit entries in date code fields. The outdated system was unable to support the operational effectiveness, reduction in cycle time and the complexity the company required.

In 1996, Liz Claiborne launched an overhaul of its information systems. To ensure Y2K compliance and to better meet the increasingly sophisticated needs of the retail industry, the company decided to rebuild its business applications with new platforms and software, rather than fix 25 million lines of legacy code. The project included:

- deploying an information system that would streamline decision-making, facilitate integration between business units and make all systems Y2K-compliant;
- developing a system to increase responsiveness to customers by providing timely information that will reduce production costs, complexity and cycle time;
- creating a business-to-business extranet Web site that gives customers access to realtime purchase order delivery information and provides a direct link to customer specialists.

The overhaul involved migration to an HP 9000 UX and Oracle-based environment. Packaged client/server applications run on HP 9000 K class servers and feed a centralized data warehouse with a decision support system (DSS). Most of the enterprise applications, including the warehouse automation and management systems, design automation applications and automated merchandising system, run on HP K class machines. The core business system runs on HP V class servers. The DSS runs on the HP EPS 22 Enterprise Parallel Server.

The company decided to rebuild its business applications with new platforms and software rather than fix 25 million lines of legacy code.

The company selected Hewlett-Packard to be its strategic technology partner because of its reputation and strong partner relationships with other industry leaders. Liz Claiborne decided to move from a vendor with which they had a 20-year history to partner with Hewlett-Packard because they wanted to minimize risk, to have reliable technology, and to have a single large database running on a single hardware platform—a client/server architecture that would support an Oracle RDBMS.

In addition to providing the hardware, Hewlett-Packard is acting as a partner on the Internet application. "It's a true partnership experience," says Liz Claiborne CIO John Sullivan. "We share the risks together with the successes. We couldn't expect any more from a partner.

"They helped us to architect hardware plans for 1998 and for the future. In fact they acted as the chief architect for the system. They've introduced us to other partners to collaborate with. They've provided consulting services on business and technical issues. They've acted as trainers, bringing 200 people from one platform to another via training programs. They've delivered everything they promised, and more."

The planning stage of the project is complete and the systems development and pilot implementation stages are in progress. The company's financial systems were upgraded for Y2K compliance in 1997. The testing and the initial implementation phases of a significant portion of the project have been completed.

So far, there haven't been any surprises in ongoing operating costs. In fact, Liz Claiborne Inc. has seen hardware prices drop. The company feels confident that with the completion of the project, the Y2K issue will not be a threat and that it will see a significant increase in operational effectiveness.

Data storage design is also crying out for rethinking and consolidation, inasmuch as the total cost of ownership (TCO) continues to climb at an unacceptable rate.

afforded more rigorous operating procedures. Politically, this may be the best compromise for the IT organization if the LOB executives are balking at full re-centralization of servers and data storage.

After co-location, server consolidation can take the form of a cluster of servers. IDC has identified four types of clusters. 1) A *high availability cluster* is designed primarily to provide fail-over in the event of component failure. 2) An *administrative cluster* brings together a collection of servers for the sole purpose of easing administration. Applications still run on a single node but are easier to administer because of the cluster's systems management software. 3) An *application cluster* brings together ERP products, such as SAP/R3, to better manage the integration of the packaged software components. 4) *Scalability clusters* are designed to increase the capacity of a system by spreading the workload over several nodes. IT management needs to review these four possibilities for consolidating servers with an eye to improving service to customers.

When servers are consolidated, it is common to prepare a service level agreement (SLA) between IT and LOB managers. SLAs delineate which IT services will be provided and at what cost. Moreover, because costs can be estimated for different levels of service and lines of business, an enterprise can now rank its IT investments and make decisions about tactical and strategic investments that align with business goals. For an IT department, service level management is the measure of the level of excellence the department has attained in the eyes of its customers.

IT managers should pay special attention to the translation of IT metrics into corresponding business metrics. Although an IT department can deliver 90% availability at a lower cost than 99.99% availability, these cost savings must be linked to business issues. In this case, for example, the relevant question for LOB managers is, "What will be the impact of downtime on our business?"

A thoughtful answer to this question would address many factors, including customer service, lost productivity of workers, the potential for lost sales and lost customers, and the net impact on the bottom line. Careful consideration of these issues is critical if the SLA is to serve as a meaningful contract that leads to an efficient enterprise.

The architecture of any storage system will in turn depend on the architecture of the servers. In a recent study which it conducted on storage consolidation, IDC identified three strategies for the deployment of disk storage systems within an enterprise: decentralized server-dependent storage, co-located server-dependent storage and enterprise storage.

With decentralized server-dependent storage, each disk storage system is attached uniquely to a single server, and the processing and storage hardware is dispersed geographically. In the case of co-located server-dependent storage, the processing and storage hardware resides in a single data center, but each storage system is uniquely connected to a server.

Enterprise storage is quite different. An enterprise storage system consolidates enterprise data and provides access to that data from mainframe systems as well as Unix and NT servers. Enterprise storage architectures are well suited to the server clustering concepts previously mentioned.

Hewlett-Packard

A period of data center consolidation

BACK IN 1989, Hewlett-Packard's Americas field operations consisted of 26 data centers scattered throughout North and South America, each maintaining its own order management and support systems.

However, system redundancies and the increasing complexity of enterprise-wide implementations were driving IT costs up at an annual rate of 18%. The IT organization was outgrowing its infrastructure.

To increase the organization's service levels and to control costs, Hewlett-Packard began a systems consolidation project. Initially, the project called for combining 26 data centers into six centers. It also called for these six data centers to eventually be moved to a single center in Atlanta.

Hewlett-Packard's 28,000 square foot facility in Atlanta provides 24x7 support for nearly 900 HP servers. These 900 servers include 600 in-house and 300 remotely located across the Americas.

The Atlanta Data Center handles all order processing, pre- and post-sale applications, Windows NT account administration, and e-commerce support for Hewlett-Packard's Americas operation. It supports more than 20,000 users in 220 field offices and processes more than 750,000 batch jobs per month.

In addition, more than 11 terabytes of data are stored on a variety of storage systems, including 300GB and 600GB optical storage systems, EMC Symmetrix, HP AutoRaid, HP high-availability disk arrays and HP high-availability storage arrays. Furthermore, Hewlett-Packard manages its operation with only five operators per shift.

"The forces driving consolidation are really the same issues that our customers face every time an IT decision is made."

Additionally, what Hewlett-Packard has now is a true high-availability environment with built-in system redundancies. Mission-critical system CPUs, disks, LANs and power supplies have mirrors or backups to minimize downtime, and, in case of a power outage, the data center is equipped with six turbo generators and enough fuel to continue operations for three days.

Indeed, after a major tornado ripped through Atlanta, there were only two buildings in the city that escaped power interruptions: the hospital and the Hewlett-Packard data center.

Hewlett-Packard received a quick payoff for its Atlanta Data Center consolidation. In the first year of operation alone, the consolidation resulted in nearly a 20% IT cost reduction. In subsequent years, the decrease in IT costs went from 18% to 3%. Furthermore, application rollouts that had previously taken 18 months to implement can now be done overnight.

"The forces driving consolidation are really the same issues that our customers face every time an IT decision is made," says Bill Russell, vice president and general manager of the Hewlett-Packard Enterprise Systems Group. "On one end of the scale, it's the level of service. On the other end are the costs of providing that service.

"And what makes the systems consolidation so appealing," continues Russell, "is that when it's implemented well, you can significantly improve service levels and lower costs at the same time."

The success of the Atlanta Data Center heralded a series of subsequent systems consolidations for Hewlett-Packard. Beginning with 153 data centers across the world in 1989, Hewlett-Packard has reduced the number of its global data centers to just ten over the past decade.

Advances in both telecommunications and Hewlett-Packard systems have made a centralized computing environment a cost-effective solution for companies that want to rethink their IT infrastructures to eliminate redundancies. "Since we developed our own operations center, we are better able to serve our clients because we have practical, real-world experience," says Bob Walker, vice president and general manager of Hewlett-Packard's Professional Services Organization.

Today's networks form the heart of much of the real world of business. Given this vital role, it is no surprise that IT managers are conservative when it comes to accepting new technologies, new equipment suppliers and new service providers into their networks.

In a recent study, IDC interviewed data center and storage managers who had taken the enterprise storage approach as a part of re-centralizing systems. These managers reported an interesting mix of costs and benefits when contrasting decentralized server-dependent storage with enterprise storage. Most dramatically, they estimated that enterprise data consolidation increased the amount of data that an administrator could manage by a factor of 7.5. (Granted, the salary for that employee is likely to be twice the salary of an individual capable of managing decentralized server-dependent storage systems. This reduces the labor saving s to a factor of 3.75.)

In addition, the cost of enterprise storage systems is approximately twice that of server-dependent systems. Still, once all these numbers are brought together, IDC concluded that the total cost of storage is lower for consolidated enterprise storage systems due to increased management efficiency. Compared with server-dependent storage, properly implemented consolidated enterprise storage can dramatically reduce the cost of managing storage while improving application availability, avoiding costly losses of data and adding business value.

Although the possibility of reducing storage costs threefold is a compelling tactical reason for consolidation, there are strategic considerations that may be more important. Information has increased value when it is shared across the enterprise. For example, the consolidation of storage is a crucial step toward enabling data warehousing to be implemented efficiently.

Manufacturing industries may discover that opportunities exist in integrating product data management systems with marketing systems. In the retail an financial services industries, data mining may uncove important trends in data warehouses filled wit detailed transaction data. IT managers would be wis to consider the strategic consequences of providin shared data to the enterprise. For all industries, unifie data has a concomitant need for reliability and performance that is best provided by an IOD facility.

Halting software proliferation

Once they have established a strategy for server an storage consolidation, many organizations have foun that a review of software can bring them major opportunities for savings. In many organizations, softwar tends to proliferate; products are often added becaus of one particular function in a suite or because of disparate LOB purchasing behavior. Software vendor often compete by adding functionality in new version of their products that overlap or duplicate those o their competition.

When a software manager takes a step back an considers the technical offerings of all installed products, he or she is likely to uncover functional duplication. Each separate product requires continue attention from technical programmers and continuall increasing maintenance fees payable to the independent software vendors.

The duplicate functions that can be quickly elim nated are usually in varying versions of systems management software and middleware. Duplication occu when different areas of the company adopt multip point solutions for items such as backup. Adopting single software platform greatly improves the admini

Transco

Mandate creates need for new architecture

THE LARGEST BUSINESS UNIT OF BG PLC, a privatized natural gas utility in the U.K., Transco provides a gas transportation system and owns and operates the entire 267,000 km of the UK's gas pipeline.

In March 1996, shippers other than British Gas became able to use the Transco network. Since this happened overnight, by government mandate, Transco needed a new IT infrastructure as soon as possible. Since it was one of the first utilities to encourage supplier competition, the road ahead was uncharted and a matter of keen interest to politicians, citizens and members of the utility industry.

New systems are usually designed with scalability in mind; the new billing system at Transco was no exception. Following a government decision to deregulate parts of the gas utility industry, Transco was asked to create a customer billing system that could initially handle industrial and commercial customers, with residential customers to come later.

(The reason for this is that there are 26,000 industrial consumers and 500,000 commercial users, but 20 million residential customers. Transco's system, called UK-Link, needed to scale by a factor of 40.)

Another system requirement was high availability. According to Paul Hastings, service delivery manager at Transco, data center operations needed to be 24x7 and for many of those hours, 1,500 customer support reps would depend on the system to provide information about meter readings, gas usage and billing.

In 1995 Transco put out to open bid an order for a system that could meet current and forecasted capacities and could offer high availability and disaster recovery. To speed development, bids had to be based on off-the-shelf technologies, and not custom solutions or next-generation products.

"We had to have a supplier we could regard as a trusted partner. We knew that sometimes we'd need access to the highest levels in the company."

These demands may seem severe, but all of Transco's business is predicated on this system. Without UK-Link performing as specified, Transco could not bill customers or provide account details to providers of gas transported by Transco. In short, it would not be in business.

Hewlett-Packard was chosen because it could identify proven off-the-shelf technologies, and because it was committed to working with the other key players. Its Professional Services Organization defined architectural choices for Transco and participated in the design of operational procedures, the integration of Hewlett-Packard technology with that of other providers, training and systems testing.

"Because of the complex technology, the high political profile of the implementation, and the time pressure, we had to have a supplier whom we could regard as a trusted partner," says Angela Sadler, UK Link project manager. "We knew sometimes we'd need access to that company's highest levels. Although technology was important, we were seeking someone with the right mindset to work with us on this project."

The system went online in March, 1996 in support of industrial and commercial users. At that time, the application was supported by ten HP 9000 servers and was used by about 200 customer support reps. In April the system was expanded to support more than 500,000 residential users, and in March 1997, the system was scaled to include another 1.5 million residential users. This was accomplished by upgrading two of the HP 9000 servers.

The final system, which scaled to support more than 19 million users, is supported by 48 HP 9000 servers. Of these, 18 support production, 12 are in production support, testing and maintenance roles, six handle middleware routing and 12 servers support development and enhancement of the application.

By IDC Analyst Dr. Henry Morris

Two Worlds of Enterprise Computing

tration of the backup function. In particular, systems management software can be a target for rationalization. One soft drink maker was able to eliminate significant duplication by consolidating its systems management software. In other cases, consolidation has in turn created the opportunity to renegotiate site licenses and to reduce costs.

Duplication also creates more work for the company when the systems are incompatible. Different divisions in corporations may have overlapping applications, such as payroll or HRIS. Even within the IT organization, different data security platforms may have emerged to address different platforms. Such situations are a barrier to excellence within the enterprise IT infrastructure. As part of the overall review, the IT department should establish common standards for all software (to the maximum degree possible), and the standards should be aimed at improving interoperability of systems and sharing of data among related business applications across the enterprise. Doing so has the added value of simplifying software contract management and the administration of concurrent usage licenses as the number of servers is reduced.

Today's networks form the heart of much of the real world of business. Given this vital role, it is no surprise that IT managers are conservative when it comes to accepting new technologies, new equipment suppliers and new service providers into their networks. Basic characteristics such as reliability, interoperability and throughput take precedence over the often more hyped future "visions" or performance maxims. What is proven to work adequately takes precedence over what has a chance to work wonderfully. What works when

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Telia

Deploying a Web/server architecture

AS AN OPERATING GROUP within Telia, the Swedish Telecom and the largest telecommunications company in the Nordic countries, Telia IT-Services outsources telecom and datacom solutions to corporations.

Recently, a large chemical company wanted to optimize manufacturing and logistics for its entire enterprise by moving from an inefficient collection of information systems to an integrated architecture. In particular, it wanted an ERP application that could be the basis for improved efficiency for its continuous manufacturing processes.

The customer's Web/server architecture uses Web technology to connect the client workstations.

The chemical company was concerned with reliability, availability and scalability. It planned to outsource operation of the system, so Telia IT not only took part in the development process, it also proposed to operate the system on an ongoing basis.

"This is a typical client," says Niklas Gunnebrant, manager of business development for Telia IT. "European companies have embraced the need for highly integrated information services and the value in leveraging ERP packages. These companies expect the system to be solid and available, and as an outsource provider, we must make sure to keep that promise."

Telia IT responded with a proposal for a Hewlett-Packard Enterprise Systems platform. Telia IT has a history of partnering with Hewlett-Packard, having worked together many times to help customers migrate to high-performance HP Unix servers which support client/server or Web/server architectures. Like the chemical company, most of these customers were saddled with legacy systems, centralized and proprietary architectures, and poor information-sharing.

Says Gunnebrant, "It is typical for Hewlett-Packard to assist us in choosing and in configuring platforms to the varying needs of customers." For this project, Telia IT and Hewlett-Packard worked through the chemical company's requirements to specify three HP 9000 K570 enterprise servers.

After evaluating many ERP packages, the client selected one called IFS Applications from Industrial & Financial Systems Corp., a supplier of software for small and mid-sized enterprises. The IFS ERP system covers manufacturing, distribution, financials, maintenance, resource management and engineering. The vendor IFS was chosen in part for its Web gateway that allows users to access the systems with browser-based client workstations. The IFS package was installed without any modification.

The system employs two HP 9000 K570s in production and a third machine ready as a hot backup. The system, which is designed for 99.95% availability on a 24x7 basis, uses Hewlett-Packard's MC/Serviceguard software, which links servers in a cluster and monitors all components. If there is a failure of a component, the software transfers the load to an alternate server. MC/Serviceguard also supports realtime maintenance and disaster recovery functions.

The architecture is Web/server, a client/server architecture using Web technology to connect the client workstations. Remote access is handled through standard browsers and TCP/IP internetworking. While Telia IT operates the server side of the system, the customer maintains the workstations and an intranet. From Telia IT's data center, the system supports the customer's remote sites in other countries, which communicate via the Internet.

The project was delivered by Telia IT on time and on budget. The system went live on Sept. 15, 1998 and is being used by many professionals within the enterprise environment throughout the customer's organization—including the logistics, financial and manufacturing areas.

Addressing Networking Issues

If your goal is to:	Take the actions below	and explore these new technologies
Consolidate technology	Reduce the number of protocols, interfaces, devices, management systems—and equipment suppliers and service providers.	IP-only routers; Layer-3 switches; multifunction remote office devices; declining use of token ring and FDDI; Web-based management systems
Improve functional integration	Identify and investigate boundaries between categories of service, e.g., LAN vs. WAN, voice vs. data management, routing vs. switching, dial vs. dedicated telephony.	ATM LAN and WAN connectivity; Layer-3 switching; combination router/remote access devices; server switches with load balancing; voice over IP
Improve performance	Identify and schedule, if possible, the most demanding applications. Align speed of WANs to match LANs in performance. Balance the performance of desktop client machines, shared servers and their networks. Improve intranet server access.	LAN switching; 100M and Gigabit Ethernet; OC-3/12/48/etc. ATM; ISDN-DSL-cable modem movements for remote users; 56K modems; server clusters/farms; quality of service features
Improve use of the Internet	Explore alternative WAN service providers. Identify key business information sources. Provide controlled access to the Internet with gateways and firewalls joining internal networks that support the user population. Consider outsourcing to Internet service providers the provisioning of networking equipment to smaller offices and telecommuting workers.	Higher-performance IP LAN and WAN switches; low-cost IP routers; Web-based management systems; special-purpose intranet servers; browser-based applications; high-capacity remote access client and server solutions
Increase support for small sites and single-user networking	Explore leading-edge technologies that enable the management of critical data outside central sites. Minimize increases in scale (number of users/devices) and the scope (number and location of sites) of networks. Engineer for improved reliability and security.	Low-cost switching and routing solutions; multifunction LAN devices offering hub, switch, router and voice functions in one box; automated configurations; remote Web-based management; higher-speed access further out on the network, i.e., via ISDN, DSL, 56K modems

Source: IDC, 1999

If your goal is to:	Take the actions below	and explore these new technologies
Avoid dependencies on VARs and distributors	Strengthen partnerships with networking suppliers. Buy equipment from more than one equipment manufacturer. At the same time, avoid the integration burdens caused by too many suppliers. Demand discounts and insist on participating in new product development discussions. Make service a top criterion for retaining a supplier.	Modular systems; reusable components; easy-to-use management systems; lower-cost devices such as $500 routers and $50/port LAN switches
Drive network investments with business objectives	Establish a formal and comprehensive justification process for network upgrades. Increase emphasis on remote sites and users, if appropriate. Focus operating budget on tactical near-term (vs. strategic long-range) requirements.	Cafeteria-style pricing and packaging (modular systems, multifunction systems); smooth yet dramatic upgrade paths; trade-in allowances; consideration of secondary market as a worthy alternative
Improve accuracy of costing	Avoid simple price-per-port acquisition calculations. Include the ongoing costs of support and staff training as a part of operating expenses. Investigate the cost and ease of future upgrades.	Common components and management systems; 100M and Gigabit Ethernet; intelligent switching; automated configuration/diagnostics; proactive management functions (e.g., modeling, simulation); ready upgrade paths (using ASICs, modular designs, software)
Improve interoperability	Streamline access to legacy systems. Avoid taking on new technologies. Select standard packages and solutions from trusted suppliers. Focus on standards. Make systems integration capability a high priority in selecting new products.	100M and Gigabit Ethernet; LAN switching; high-performance IP developments; "certified" solutions; modular designs; technology integration; solutions based on supplier partnerships, alliances, mergers, forums
Provide pervasive and high-availability access	Invest in high-quality remote access devices. Exploit redundancy to avoid single points of failure. Simplify information flows and access choices.	Wireless services; ISDN-DSL-cable modem developments; size reductions; downward price pressure; WAN performance/reliability gains; Internet as alternative access method; easy-to-access solutions

Establishing a common backup and recovery system will significantly lower costs while decreasing the likelihood of lost data—a win-win proposition.

plugged into a real, existing network is more important than any potential use within a network "island."

Still, IT managers must push forward to meet network requirements for greater reliability, improved performance, broader reach, lowered staffing levels and more cost savings. How can they do this while maintaining order within their networks? By:

- Reducing the complexity of their networks by using fewer protocols, network technologies, circuits and even suppliers.
- Looking for more functionality in a smaller number of specific network devices. This both improves the flexibility of IT's equipment and lessens IT managers' budget and management burdens in terms of acquiring and operating their network.
- Throwing extra bandwidth (such as ATM and Gigabit Ethernet on the LAN or upgrading to ATM or T-3 lines for the WAN) at any and all network performance problems. Although this may seem like an extravagant response, it actually addresses the network manager's need to keep things simple.
- Leveraging Internet-related technologies (e.g., IP, push/pull browsers and Web servers) and services (e.g., virtual private networks) into their private intranets to take full advantage of all the development activity, support resources and expertise centered on the Internet.
- Analyzing the true cost of operating their networks more carefully. This involves far more than price-per-port calculations. It requires management to determine the TCO for the networks.

Of course, this flurry of activity takes place in the often dark shadow of restrictive operating budgets, installed systems and uptime requirements. These networking issues are further discussed in the chart that appears on pp. 12-13.

Keeping staffing problems in check

CIOs are aware—painfully so—of the staffing problems that arise from the increase in the number of systems and solutions implemented. Reducing the number of locations, systems and platforms has immediate staffing consequences, and adoption of enforced software standards can reduce the skills required for operation. Help desk and technical programming staffing are directly related to the number of hardware and software products being supported.

Outsourcing work that uses infrequently needed skills can further simplify staff skill requirements, as well as reduce the number of common processes and procedures. For example, establishing a common backup and recovery system will significantly lower costs while decreasing the likelihood of lost data—a win-win proposition. Farming out non-strategic commodity services, such as broadband network services, long-term archival storage and off-site data backup, will also raise efficiency, since outsourcers specialize in these functions and can achieve economies of scale.

Staffing needs in an IT department have always grown in direct proportion to a firm's deployment of IT systems: The more automation, the more servers, storage devices and networks. Every server's operating system and middleware demands support from more technical programmers. A reduction in the number of servers, combined with a review of software that contains duplicate functions, will streamline productivity.

American Stores

Retailer's thrifty view undergoes change

THE USE OF DATA WAREHOUSES in the business environment has become a key success factor for companies on the cutting edge of retail services.

With information that they gather from preferred customer card programs, not only can retailers make better decisions on purchasing and distribution, but they can also tailor inventory in order to offer more effective and more targeted promotions.

"We have a mission to become expert ourselves in data warehousing because the use of data is a key strategy for American Stores to achieve its business and financial objectives."

With $18 billion in sales and more than 1,800 stores in operation throughout the country, American Stores lays claim to being the second largest food and drug retailer in the United States.

American Stores has more than 20 million people enrolled in preferred customer card programs. If half of these customers were to shop each week, and they were each to buy 10 items, the company could expect to collect 100 million new pieces of point-of-sale information every week. Currently, American Stores has a data warehouse that contains more than 1.5 terabytes of information, and the corporation's IT department anticipates that its storage needs will more than double in the coming year.

The huge processing and logic load in moving such large amounts of data into the data warehouse, combined with the need to quickly access and analyze the point-of-sale information from all 1,800 of its retail stores, were what drove American Stores to consolidate its data server technology on a single platform.

Consolidating the data warehouses, the corporation realized, would give it much faster access to centralized information on sales, customers, vendors and stores. But this type of consolidation would lead to other benefits. It would significantly reduce operational costs. It would also eliminate the complexity and reduce the amount of time that the IT department used to spend dealing with the idiosyncrasies of multiple servers from four different vendors.

Retailers have a thrifty view of the world, a "do a better job with what you have" attitude. But all that changed when American Stores decided to consolidate its servers.

"We didn't have enough raw technical talent to support all these boxes," says Larry Ames, who serves as director of technology planning for American Stores. "Being in retail, we have a thrifty view of the world. It was a 'do a better job with what you have' kind of scenario."

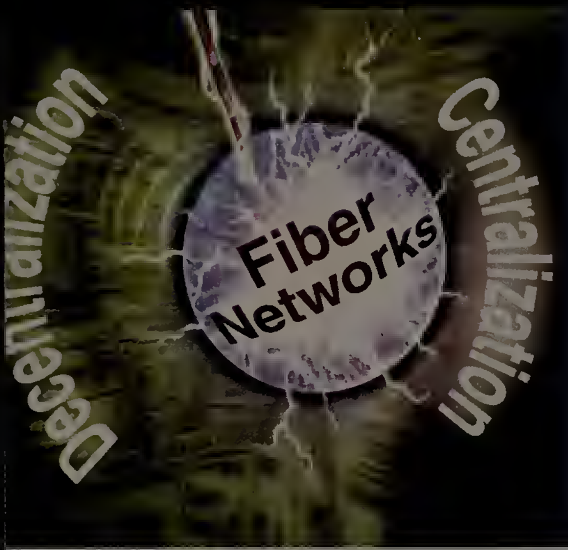
However, all that changed when the corporation decided to consolidate its servers. "The Hewlett-Packard server consolidation let us cut costs and bring new, faster solutions to the business," says Ames.

The company settled on using an 8-node HP 9000 K570 EPS cluster for its custom-developed Informix-based data warehouse and a 2-node HP 9000 K460 EPS cluster for development.

Moving to a Hewlett-Packard solution gave American Stores a single platform on which to build its data warehouses, as well as the opportunity for deploying a scalable solution to meet its growing data mining needs.

Says Ames, "We made the decision to consolidate the data warehouse applications on Hewlett-Packard because we believe they are a thoroughbred in this area.

"We have a mission to become expert ourselves in data warehousing," he adds, "because the use of data is a key strategy for American Stores to achieve its business and financial objectives."



In 1999, the ability of fiber networks to deliver resources over distances without penalty and the need to provide IOD to IT consumers have swung the pendulum toward a reconsideration of centralization.

By IDC Analysts Traci Gere and Doug Chandler

Mission-critical Service and Support

But in certain cases, adding software, in particular systems management software, will improve functionality at reduced costs. This result is achieved because systems management software permits database and application specialists to offload basic repetitive management tasks to computer operations personnel. With all three areas of IT using the same management software, what was previously highly complex becomes more manageable and less demanding on the part of all involved, and in the meantime SLA goals are improved.

Although improved systems management software may reduce the number of operators, the consolidation of servers is guaranteed to reduce staffing demands. In the future, a few, more skilled operators will manage a simpler, consolidated data center. Although each operator will command a higher salary, the bottom line will show significant savings.

With the elimination of multiple hardware components and a reduction in the number and variety of software products, further opportunities will emerge for streamlining the number of IT staff members and the breadth of knowledge that these persons must have. Such streamlining carries advantages. By supporting fewer products, fewer technical programmers would be needed to spend time mastering the installation intricacies and the operational issues regarding compatibilities with other software products. Furthermore, staffing a help desk is difficult because of the number of technologies that need to be supported. But having fewer technologies to master inside the enterprise would lead to a more efficient and responsive help desk, one with a more complete understanding of those technologies that are supported.

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Telstra

Providing top-of-the-line Internet service

FOR MANY SMALL businesses, the Internet is no longer a novelty; it's a necessity. In the past few years, dependence on the Internet, e-mail, e-commerce and intranets has increased. . .as has consumer desire for faster, more reliable Internet access and for continuous online access without tying up a phone line.

Telstra is the largest telecommunications carrier in Australia, providing telephony, cable television and Internet services. Its Big Pond Cable (BPC) service provides high-speed Internet access to 1.6 million customers in Sydney and Melbourne through its existing hybrid fiber/coax (HFC) network.

Because Telstra's requirements were functional, e.g., response time, it was not interested in the underlying hardware.

Telstra's HFC network has provided infrastructure for pay TV since 1995. When Internet usage rapidly accelerated, Telstra began developing an Internet service system to make fuller use of its cable network. In May 1997, the BPC system came online in Sydney and Melbourne.

Of the 600 to 800 ISPs in Australia, only BPC offers telco-grade service to residential Internet users. BPC customers are always online without tying up a phone line, they have continuous e-mail, and they enjoy transmission speeds 100 times faster than conventional dial-up.

BPC charges for Internet access not by time, but by amount of data transferred to or from a customer's PC. Because BPC users are small businesses and individuals logging in from home who want 24x7 availability and fast transmission, they'll pay a few dollars more per month to have direct, continual access.

Telstra's requirements were functional, e.g., response time and performance. It described its needs to vendors in terms of number of customers, amount of Web traffic, number of customers reading news and using e-mail, and expected volume of information up- and downloaded. "We weren't interested in the underlying hardware," says Glen Law, national manager, Internet Services, adding Hewlett-Packard's solution was selected because it best met Telstra's requirements for a minimal-risk solution that answered its concerns: reliability, scalability and flexibility.

BPC also sought a supplier with principles similar to its own. Hewlett-Packard has a large, Australia-based organization and local expertise, understands the local culture and has a reputation for following through. "Hewlett-Packard settled in Australia for the long run," says Phil Sykes, national general manager, Internet IT Product. "They're not likely to cut corners because they know they'd have to deal with problems later."

The project met Telstra's goals. Its schedule was aggressive—12 months from specs to deployment—but Hewlett-Packard met all of Telstra's milestones and completed the project on time and on budget.

Telstra's BPC group bases its service on Hewlett-Packard's Broadband Internet Delivery System (BIDS), an integrated server complex that handles Internet connectivity, content storage, firewall security, and network and subscriber management. BPC's architecture consists of network server complexes in Sydney and Melbourne. Each site has seven HP 9000 K-series servers in production, plus another one offline for testing and validation.

The platform supports a billing system, service management systems, network management, an Oracle customer database, and a Netscape proxy and work server. The HP BIDS system is the glue that holds everything together. Its key advantage is availability. "Hardware isn't the whole story," says Law. "Availability is a combination of design and support systems and processes."

BPC is working on improving security. It wants to expand its business to the corporate desktop market, and security must be bulletproof to attract corporate customers.

Wells Fargo

How to manage a vast enterprise network

WELLS FARGO IS A [illegible] diversified financial services company. Since 1852, the Wells Fargo stagecoach has been a symbol of reliable service across the American West.

Today, Wells Fargo aims to provide efficient, personal and responsive 24x7 service by connecting its customers to essential financial services by ATM, telephone or personal computer, as well as through a growing network of traditional and supermarket branches. Following its recent merger with Norwest Corporation, Wells Fargo now has $196 billion in assets and more than 100,000 employees.

The IS team in the company's wholesale money management group manages 3,000 desktops. As the number of desktops remains constant, this department expects to reduce the number of servers that they use to manage the corporate network from 172 to 158.

This reduction in the number of servers will be made possible through the use of more reliable hardware, plus the sophistication of management tools such as OpenView from Hewlett-Packard. At Wells Fargo, 100% of the servers and 20% of the desktop computers are managed centrally.

Connecting all the desktops at Wells Fargo is a very large enterprise network consisting of 4,500 routers and 8,000 hubs. The network management upgrade resulted in a 60% to 80% decrease in staff time required for installation and upgrades, network troubleshooting and repair time, and time spent on normal desktop management.

> The network management upgrade resulted in a 60% to 80% decrease in the staff time required for installation and upgrades, network troubleshooting and repair time and time spent on normal desktop management.

In other areas, including server operating system support and system tuning, user support/help desk, server setup and configuration, and disk management, file management and database management, requirements for staff time were reduced by at least 20%. In addition, there was a significant increase in network availability.

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The scalability of Hewlett-Packard's OpenView management tool was particularly applicable to the situation at Wells Fargo. The bank grew its network extremely rapidly from 200 branches, when it first installed OpenView, to more than 1,700 just prior to the merger with Norwest.

Today, the company has thousands of hubs and routers installed. The network managers at Wells Fargo believed that the Hewlett-Packard management solution was the best one for the task at hand. Furthermore, since having completed the implementation, they also believe that the OpenView product has more than paid for itself.

Wells Fargo is a major user of Hewlett-Packard's management tool, with virtually every tool installed. The bank particularly likes the fact that Hewlett-Packard's APIs can be customized by the user to meet individual requests, such as having alarms sent along with suggested actions.

Wells Fargo has found that Hewlett-Packard hardware and software are both excellent investments and the bank is highly pleased with the responsiveness that Hewlett-Packard has shown to all its service needs.

This supplement was sponsored by Hewlett-Packard's Enterprise Computing Solutions Organization (ECSO), a multibillion-dollar ($15B in FY98) organization with 44,000 people. It is focused on advancing the state of the art in technology and services to help businesses worldwide use information technology to dramatically improve customer service and operational efficiency. ECSO's solutions comprise equally strong offerings in computer hardware, software and services from both Hewlett-Packard and its partners.

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This White Paper on Harnessing the Power of Change was created by Computerworld Enterprise Business Solutions. Reprints of the supplement can be ordered through Heidi Broadley at (508) 820-8536 or she can be reached via e-mail at heidi_broadley@cw.com.

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Conclusion

Ten years ago, the pendulum was swinging in the direction of decentralized architectures, driven by the birth and rapid maturation of microprocessor-driven computing and the need to move resources closer to users. In 1999, the ability of fiber networks to deliver resources over distances without penalty and the need to provide IOD to IT consumers have swung the pendulum toward a reconsideration of centralization.

A company cannot achieve IT excellence by acting alone. Movement toward a consolidated corporate IOD facility will require the cooperation of many parties, not the least of which will be the major vendors currently installed in the enterprise. All vendors will seek to influence the IT executives in order to maintain, and potentially grow, their installed base. Suppliers to large enterprises are aiming to deliver systems that provide IOD, and IT departments are partnering with these suppliers to undertake consolidation projects.

However, IT executives will need to exercise care in partnering with vendors. The wise IT executive will assess each vendor's business and product strengths, as well as their customer orientation, and will ask the following questions:

- How do the products rate in terms of functionality, reliability, scalability and performance?
- Is the vendor's development strategy for future products a clear one? Do they have a track record for delivering on strategies? What are their financial and market strengths? How does their product and service breadth fit into the user's strategic drive for excellence?
- Will the vendor provide installation and product support during consolidation, as well as ongoing service and support through the vendor help desk and online documentation?
- How responsive is the vendor to the user group's recommendations for enhancements and fixes?

The bottom-line question is: Can CIOs partner with a vendor and make a corporate marriage that will stand the test of time while attaining the excellence the company seeks? Successful partners are those who provide a full line of services and integrated products (directly or with partners) and who are willing to share in the risks of consolidating mission-critical systems.

Excellence is not achieved in a single project or over a short period of time. The pursuit of excellence is a way of life for the IT executive. Continuous improvement and refinement of IT technology's infrastructure for the benefit of the enterprise's bottom line require a continuous review of emerging technologies and, when appropriate, their adoption and integration into the business life of the corporation.❖

The principal author of this White Paper is Thomas Oleson, who brings years of MIS experience to his role as Research Director of IDC's IT Advisor, a one-stop research and advisory service that provides IT decision makers with practical advice and innovative tools to help them make the best decisions and save money. In his role, Oleson focuses on the management of the IS function. He brings an understanding of how IS relates to the enterprise and the financial impact of IT on client companies. He can be reached at toleson@idc.com.

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Briefs

Dell and Linux vendor **Red Hat Software** last week announced an alliance under which Dell will install Red Hat Linux in Dell servers and workstations.

Dell will install the software in its PowerEdge, OptiPlex and Precision products prior to shipping.

Dell will now preinstall Red Hat Linux on its PowerEdge servers.

This is not the first time the companies have teamed up: They previously have worked together to ensure that Red Hat Linux runs on Dell machines.

Dell also announced that it has taken a minority stake in Red Hat, but refused to say how much it has invested.

Persoft has announced SmarTerm 9.0, a suite of products for managing PC-to-host access.

New in the Madison, Wis., company's software is the ability to centrally manage and distribute access software.

Net administrators who install SmarTerm 9.0 on servers are able to create user profiles, control host access and customize client interfaces.

Also new in Version 9.0 is support for Citrix WinFrame and Microsoft Windows NT Server, Terminal Server Edition.

SmarTerm handles connectivity to a variety of hosts, including IBM's S/390 and AS/400, and legacy Digital Equipment servers.

The SmarTerm suite will be available this quarter, with prices starting at $225 per user for connectivity to one host platform.

Persoft: (800) 368-5283

IT groups warming up to handhelds

BY JOHN COX

Rather than shutting their eyes and hoping handheld PCs will go away, IT departments are doing what they can to make the devices valued extensions of corporate networks.

Slightly more than half of the 55 companies surveyed recently by AMR Research have established formal IT support policies for handhelds, indicating that companies are taking the newest of network clients seriously. This may not be a huge sample, but anecdotal evidence also suggests that companies aren't fighting the emergence of handhelds; rather, they are getting down to the business of formulating data and network security policies.

"We were surprised at the rate of acceptance of these devices," says Scott Lundstrom, an AMR vice president.

End-user acceptance has been fueled by the handhelds' low prices and ease of use. End users are finding it easy to hook the devices into corporate networks, largely as a result of the software that vendors are building into handhelds.

Lundstrom says the security risks of linking handhelds to corporate networks are similar to those of linking laptop PCs to networks.

Typically, end users start using the devices to synchronize data with their PCs, says George Davis, chief operating officer at Aether Technologies, a wireless integrator in Owings Mills, Md. "Then they start synchronizing with corporate databases," he says. "As they get into that, companies get nervous. They wonder: How are we going to control people with this kind of access to our data?"

Security controls need to be layered, Lundstrom says. Companies should protect data on the device, in case it is lost or stolen, but also should safeguard access to the corporate net and servers. Lundstrom recommends using a password for the device when it's first turned on, and using another password before moving data to or from servers.

Accompanying these controls should be policies that define what data and documents can be downloaded to handhelds, Lundstrom says. Companies also should establish procedures for tracking and protecting intellectual property when it resides on a handheld, he says.

At the same time, IT executives warn that security systems should not interfere with end users' abilities to use handheld devices for legitimate purposes.

One brewery is piloting a sales survey application on Hewlett-Packard 620 handheld PCs. Initially, users had to go through the standard corporate security process which was designed for PCs. The handhelds locked up or the connection repeatedly failed, says the project manager.

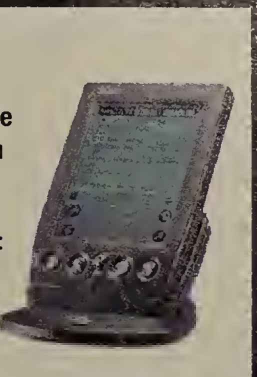
He has created a stand-alone server to support the handhelds, with no direct link to the corporate net. The downside is that he has to transfer data manually between this server and the net.

Giving handhelds a hand

Handheld computers are quickly being integrated with corporate nets. About half of the 55 companies surveyed by AMR Research rely on their IT groups to support these devices.

The percentage of respondents answering "Yes" to the following questions:

• Does IT have a role in managing PDAs?	51%
• Do you have security policies for PDAS?	44%
• Do you use passwords when starting PDAs?	37%
• Do you use passwords when moving data from a PDA to a PC?	29%
• Do you have rules about storing information on PDAs?	27%



Corporate IT departments are learning to cope with users' handheld devices, such as 3Com's PalmPilot.

IBM primes RS/6000 for Web serving

New model boasts up to four 64-bit processors.

BY MARC SONGINI

SOMERS, N.Y. — IBM is readying a new RS/6000 server that runs Web programs up to 70% faster than its predecessor.

The company's new H70 four-way server boasts faster processors and vastly improved I/O handling capabilities compared with its predecessor, the H50.

According to IBM, the upgrades enable the H70 to handle nearly 12,000 Web hits per second. IBM says its new server is also well suited to run data mining, enterprise resource planning and other processing-intensive applications.

The company is pitting its server against the likes of Sun's E450, Hewlett-Packard's K580 and Compaq's DS 20 AlphaServer.

The H70 features up to four 64-bit RS64-II chips, each with 4M bytes of error-correcting code memory cache. The new 357-MHz processors are faster than the H50's 32-bit chips and can run 32- and 64-bit applications, IBM says.

The new server is equipped with four PCI buses and controllers to ensure speedy throughput. IBM estimates that its server can handle I/O transactions at up to 500M bit/sec, a 30% improvement over the H50's performance.

The H70 supports from 128M bytes to 8G bytes of memory. The machine comes with IBM's AIX 4.3.2 operating system software and a 10/100M bit/sec Ethernet adapter.

Quik International, an ISP franchiser that already uses three H50s, is replacing them with H70s. Quik President Jack Reynolds says his company's fast growth demands the greater speed and memory available through the H70's 64-bit architecture.

Pricing for the H70 starts at about $27,000, and the product will be available April 23.

IBM: (800) 426-2255

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Server operating systems need tender Y2K care

More than half of today's major server operating systems require an upgrade or patch; some vendors refuse to test older releases.

BY CHRISTINE BURNS

Second in a four-part series.

With the end of the year fast approaching, don't overlook potential Millennium Bug problems in your server operating system — it may need a patch, an upgrade or both.

The root of the Year 2000 problem generally rests in the underlying server hardware, which may start misrepresenting the date once the dial rolls over to Jan. 1, 2000. Unfortunately, server operating system software residing on the server hardware can unknowingly replicate the incorrect date across the network.

The main problem is in the BIOS software that is built into each physical server and which controls fundamental hardware operations. Most BIOSes cannot adjust to the rollover to 2000. Server operating systems communicate directly with the BIOS, and the operating systems can, in turn, pass on incorrect date information to unsuspecting server applications that request a time stamp.

On the software side, there are two issues you need to consider when checking your server operating systems for Y2K compliance. First, find out if the software can read dates later than 1999. Second, if the software is handed a wrong date from an old hardware BIOS, determine whether the server operating system will make the correction or pass the error onto applications. If your server operating system can read 2000 dates but does not have an internal mechanism that knows when it has been passed a bum number, there will be serious Y2K repercussions.

Of course, if you upgrade your BIOS, you only have to worry about whether your software can handle post-1999 dates.

In this age of heterogeneity, most enterprise networks have servers running a range of server operating systems, which makes compliance-checking a bigger hassle. Fortunately, Y2K service vendor Infoliant has an online hardware and software compliance-tracking system that makes the job a little easier.

A *Network World* survey of the Infoliant database shows that the majority of server operating systems available today need Y2K work. In more than 50% of the cases, users will have to upgrade to the latest version of their respective server operating systems. Others will merely have to download and apply a Y2K patch, and a third set will have to take both actions to remedy the pending Y2K situation.

Work to be done

What you need to do to your server operating systems to make them Y2K-compliant.

Product	Y2K-compliant?	Action needed
Banyan Vines 8.5	yes	None
Vines 8.0 and earlier	no	Upgrade to Vines 8.5
HP-UX 11.0	no	Apply free patches
HP-UX 9.0 and earlier	no	Upgrade to HP-UX 11.0
IBM OS/2 LAN/Warp Server 4.0	no	Apply free patch
IBM AIX 4.3.2	yes	None
AIX 4.3.1 and earlier	no	Apply free patches
Microsoft Windows NT 3.51	no	Apply free patches
Windows NT 4.0	no	Apply free patches
Novell NetWare 3.2, 4.2 or 5.0	yes	None
NetWare 2.X, 3.11 or earlier, 4.0	no	Upgrade to NetWare 3.2, 4.2 or 5.0
NetWare 3.12 or 4.12	no	Apply free patches
Sun Solaris 2.3-2.6	no	Apply free patches
SCO UnixWare 7.0	no	Apply free patches
UnixWare 1.X and 2.X	no	Upgrade to UnixWare 7.0 and apply patches

They're ready

In the compliant column are Banyan System's Vines 8.5; the latest update to IBM's Unix-based AIX, Version 4.3.2; and IBM's version of OS/400 that runs on RISC servers. Compaq's Digital Unix Version 4.0D has also passed the compliance test. However, previous versions of all these products require a patch if they are to function properly next year.

Novell customers who have managed to keep their server operating systems current are in the best shape. The new IP-based NetWare 5.0 and the most current versions of Novell's other major releases, NetWare 3.2 and 4.2, are all fully compliant. Novell is not testing NetWare 2.X, NetWare 3.11 and earlier, and NetWare 4.0 for Y2K compliance. In most cases, Novell suggests that customers upgrade to any compliant version. However, NetWare 3.12, 4.10 and 4.11 customers can download Y2K patches from Novell's Web site.

While Novell seems to have tackled the Y2K issue on the server side, users should be aware that they also need to take a look at the client software that sits on each desktop and allows those machines to connect to the NetWare back end. Novell has compiled a long list of client software that the company will not be testing for compliance, thereby creating a situation in which some users will have to upgrade thousands of desktop machines on their networks.

Of the more than 20 clients available today from Novell, only half are Y2K-compliant. NT Workstation users can choose the already Y2K-compatible Novell Client Versions 4.3 and 4.5 for Windows NT. Compliant clients for Windows 9X PCs include Novell Client Versions 2.5 and 3.01 for Windows 95 and 98, and the NetWare/IntranetWare Client Version 2.20 for Windows 95, which is also known as Novell's Client 32. For older systems, the Novell Client Version 2.6 for DOS/Win 3.1X is 2000 ready.

Novell officials downplayed the hassle of rolling out Y2K patches to thousands of desktops. They say the process can be significantly eased with its desktop management suite, ZENworks, which allows an administrator to distribute software using Novell Directory Services (NDS). A five-user ZENworks starter pack ships with each NetWare 5.0 and 4.X box.

On the Unix side of the server market, the leading vendors are all requiring users to take action. The Santa Cruz Operation requires that all its Intel-based UnixWare users upgrade to Version 7.0 and then download a free patch. Sun's Solaris — the recent Version 2.6 and past releases going back to Version 2.3 — require a free patch for compliance. Hewlett-Packard has supplied a series of fixes for its HP-UX Version 11.0 systems, but it will not offer fixes for past versions of the product.

IBM's PC-based server operating system, OS/2 Warp/LAN Server, also requires users to apply a Y2K patch.

Open source Linux products were not considered for this article because compliance information is not readily available.

Beyond the BIOS

Server operating systems now include a slew of services — from directories to built-in Web servers — and utilities that make the servers more manageable. These services and utilities must both be checked for Y2K readiness.

NDS for NT and the version of NDS that runs on NetWare have received clean bills of Y2K health. However, Novell is telling users to swap out its Novell Web Server in favor of Netscape's Fast Track Server if they want to be Y2K ready. Novell has dropped its Web server from its list of supported products and, therefore, has no plans to test it for Y2K compliance.

Microsoft's Internet Information Server, which comes with NT Server, is reported to be compliant. However, it is mainly in the utility area where Microsoft falls down.

For example, the Windows NT 4.0 User Manager Utility does not recognize that February 2000 has an extra day due to the leap year. Also, the NT 4.0 Control Panel Date/Time applet may display a date that is ahead of the actual system date. In NT 3.51 systems, the IP addressing service known as WINS/DHCP Admin will misrepresent the years 2000 to 2009 as 1900 to 1909. Also, NT's File and Print Services for NetWare can't handle the four-digit date, and the date of queued print jobs may be off by as much as a year.

Microsoft claims that applying the same Y2K service packs that remedy the Millennium Bug in the Windows NT operating system will remedy these utility problems before New Year's Eve rolls around.

The rollover to 2000 is only eight months away, but with proper care, server operating systems will be the least of your worries.

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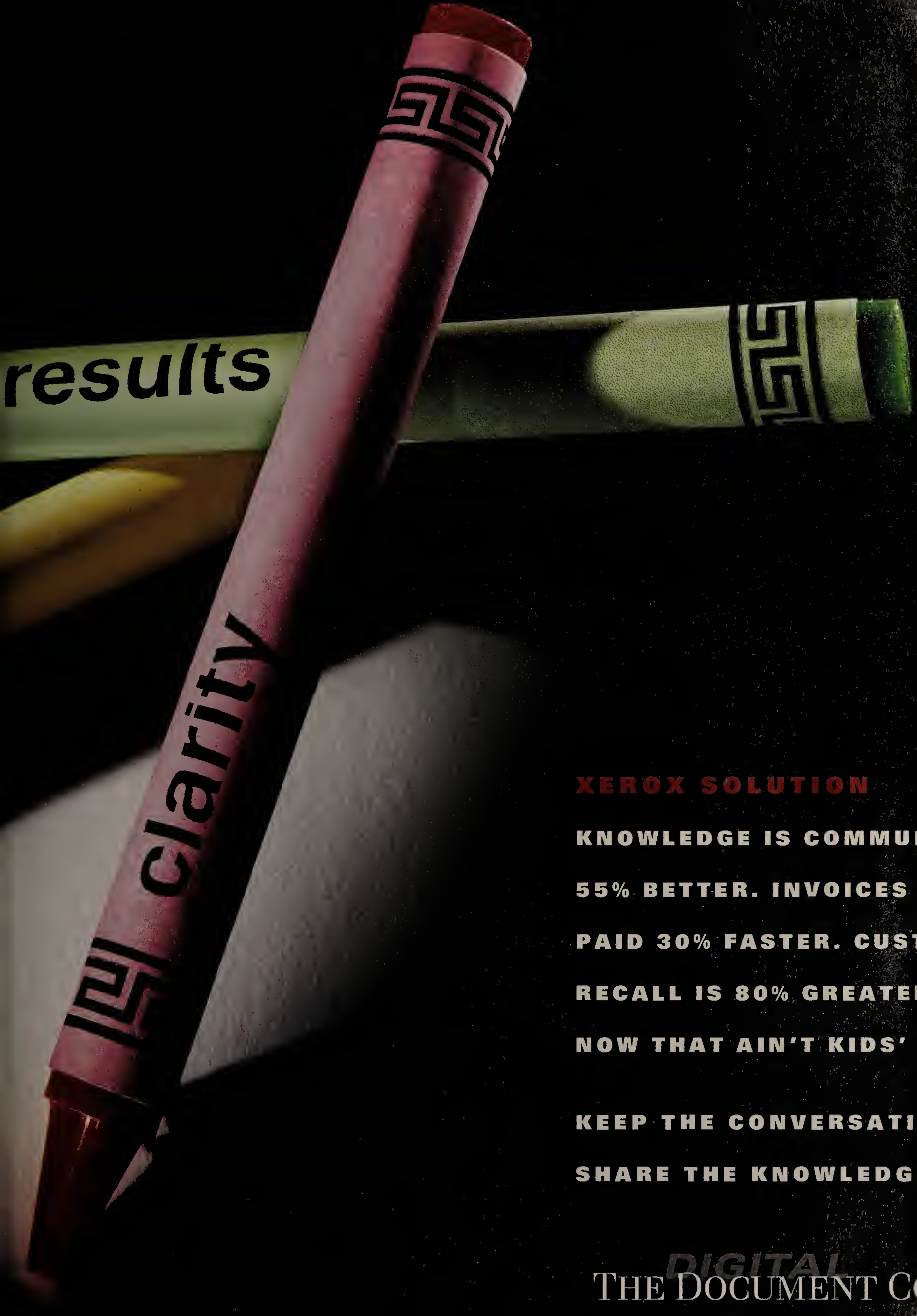

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Novell gets into entrepreneurial mode

BY CHRISTINE BURNS

SALT LAKE CITY — It's not a bad deal being a software engineer at Novell these days.

While the marketing team is busy trying to convince the network industry that directory-enabled applications — especially Novell Directory Services-enabled ones — are the way to go, Novell engineers are having a lot of fun producing the goods to prove the company's point.

Novell Chief Technology Officer Glenn Ricart recently outlined for *Network World* how Novell's newly streamlined process for proposing technologies within the company is encouraging a lot of good engineering ideas to surface.

Novell Chief Technology Officer Glenn Ricart is excited about new directory projects.

"We had a period of a little more than a year where we were focusing on getting the promised products [such as NetWare 5.0] out the door and suppressing the new ideas a bit," Ricart says. "Now within the company, we are into a more entrepreneurial mode than I have ever seen."

Novell has established a program dubbed the New Products Pipeline, which provides employees with added incentives to devise new technology ideas. Any employee can present an idea to the Pipeline review committee, which meets monthly. If the committee accepts the idea, that employee gets a $2,000 bonus and the opportunity to assemble a small team to start transforming the idea into a product.

Most of the half-dozen or so ideas now going through the Pipeline, also known as the Pipe, are directory- or Internet-related, Ricart says. His personal favorite is a unified directory image technology, which lets users view information stored in multiple directory services as if they were looking at information contained in only one.

"Whether we will release this as a product is not a question at the moment. We are just doing interesting research on navigating across directories," Ricart says. He adds that Novell is even looking at how to get the Internet to look like it has a single directory. ◪

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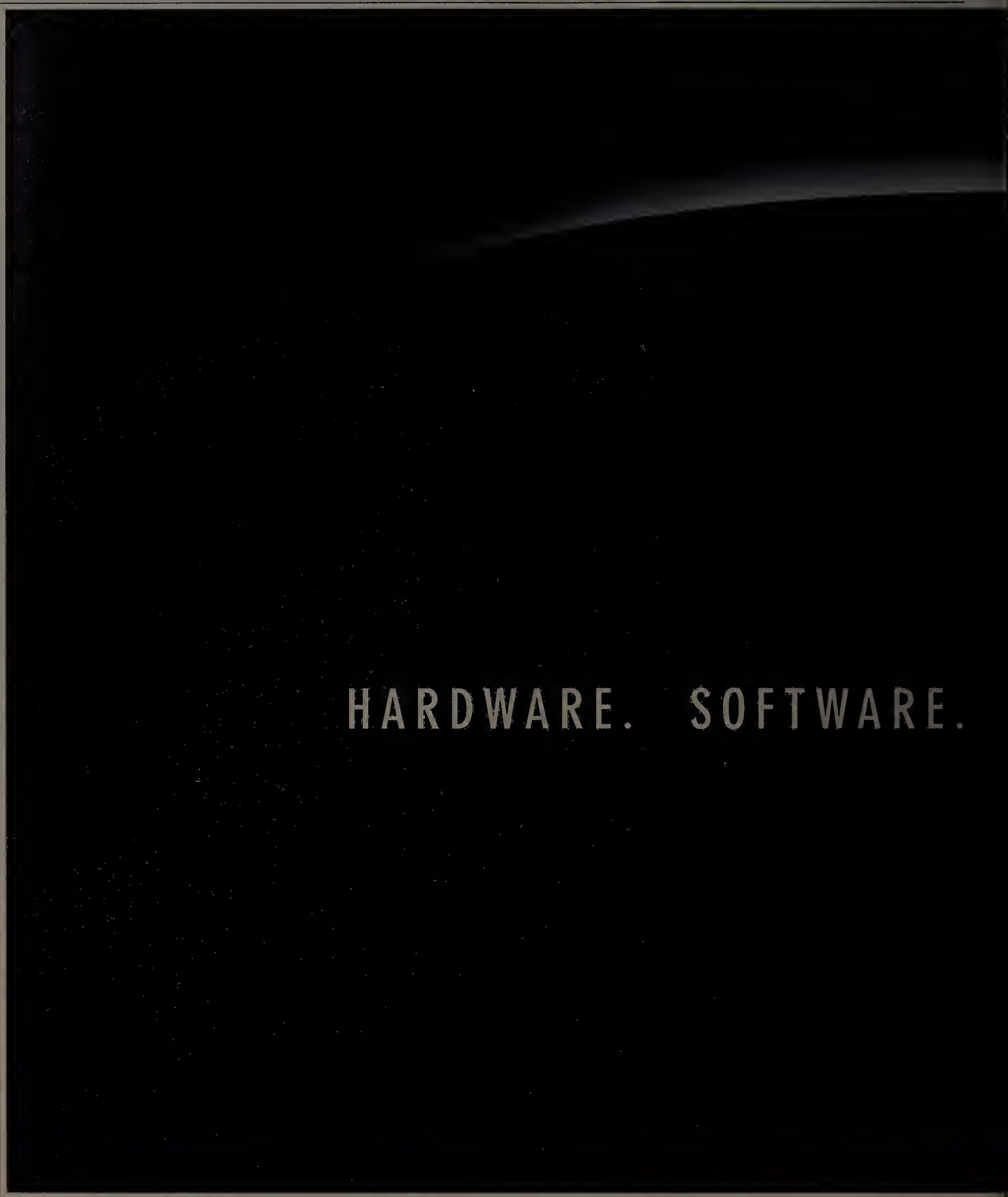
- The entire Ricart interview.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Wired Windows . **Dave Kearns**

FINDING THE REAL BRAINSHARE BUZZ

Recently I made my annual pilgrimage to Salt Lake City for Novell's BrainShare event. While there was a sense of excitement among the attendees, there was also a sense of puzzlement about the show's big announcements.

While the Internet Caching Appliance and digitalme garnered headlines, they aren't products or initiatives that appeal to net administrators. Instead, they're aimed at a new target market — ISPs.

Fortunately, I was rewarded on the last day when Drew Major (the geek's geek) and his sidekick Glenn Ricart outlined a future expansion of BorderManager that will act as what they called an identity broker. The identity broker combines directory services with proxy services in new ways — ways that will ultimately benefit the user, content owner and network administrator.

The most compelling example of the forthcoming services was graded authentication, in which a user's access to network data and objects is governed not only by a user's identity, but also by a user's access method. Sensitive data can be restricted so it's accessible only by authorized users and only when they use secure access methods.

Another identity broker service moves all Web site passwords and cookies into the directory controlled by the identity broker proxy. No more storing password lists on an end user's local PC. Instead, once you've initially logged on to a Web site (and given the information to the identity broker), the proxy will authenticate you in the background whenever you access that site. And as long as you use the proxy services of the identity broker, you can use any client machine without having to remember authentication information.

However, if you prefer to access some sites anonymously, identity broker will handle that for you by throwing away the cookie sent by the site. It will throw away the cookie — not reject it — because rejection would mean some sites would deny you access. Visit the Full Service Directory Web site (www.novell.com/corp/strategy/fsd/), for more information.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

Tip of The Week

Wireless networking has been around for many years, but a couple of Irishmen hope to change it dramatically. John Early and Bill Riordan seek to patent a new encoding technology, specifically for wireless, which could mean 100M bit/sec bandwidth (and more) using any wireless method — infrared, microwave, radio frequency and others. The pair has already shown 20M bit/sec over infrared as a demonstration, and they are now seeking partners to adapt the encoding technology. Watch for Supergold encoding on a wireless network card in the near future.

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Intel's network equipment gamble pays off

BY DENI CONNOR

Intel has never had any illusions about being the network industry's next Cisco. But the chip maker has quietly established itself as one of the leading providers of network gear for small and mid-size businesses and is making the kinds of investments in network companies that would make Cisco proud.

INTEL'S NETWORK THRUST

It may not be Cisco, but Intel is winning over small and mid-size businesses with its network gear.

Intel has succeeded in the network market by emphasizing low prices, high volumes and lots of component-level gear. The company has invested in hot technologies, such as virtual private networks (VPN) and Gigabit Ethernet, but has stopped short of introducing high-end enterprise network gear.

"We're not going to make very large switches and routers for the Fortune 1000 enterprise or telco industry," says Mark Christensen, who heads Intel's Network Communications Group. "Why should I go do a frontal assault on that marketplace? I'd get killed."

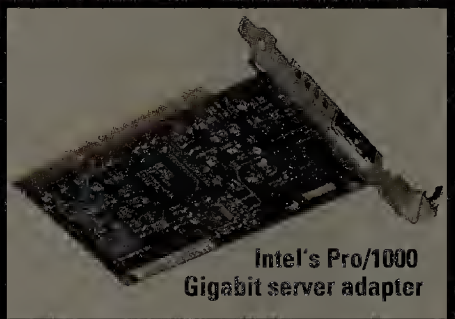
Instead, Intel is offering small and mid-size companies key network components, from network interface cards (NIC) to routers. Intel also provides software for managing networks.

Intel's fast-growing network business now accounts for about 10% of the company's annual $26.5 billion in revenue. Intel is looking at acquisitions, partnerships, licensing deals and OEM agreements to build the business, Christensen says.

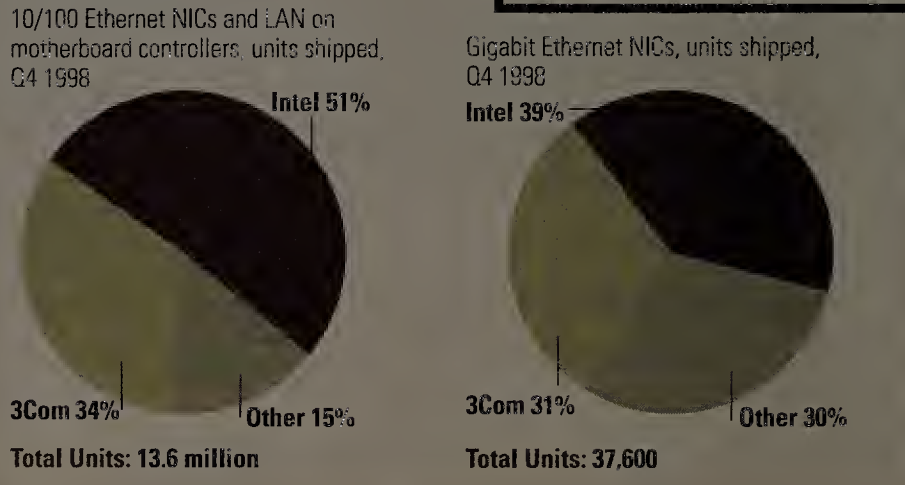
And why not build the network business? The more reasons Intel can give customers to network their PCs and servers, and to buy faster versions powered by new Intel processors, the better for Intel's overall business.

Intel's knack for NICs

Intel had a strong Q4 last year, beating combined rival 3Com for the lead in 10/100 Ethernet NIC and integrated LAN controller shipments and in Gigabit Ethernet NIC shipments.



Intel's Pro/1000 Gigabit server adapter



The company has divided the network market into a handful of segments and is keeping its focus on:

- Network adapters for all sizes of companies.
- Switches, hubs, remote access products and network appliances, for small and mid-size enterprises.
- Component-level products sold through OEM partners.
- Products for home computer users.

NIC leadership

By far, Intel has been most successful in the NIC business, in which the company actually topped established leader 3Com in two categories during the fourth quarter of 1998 (see chart).

In particular, Intel has shined in the market for NICs that are built into chips, which in turn are built into computers. Intel's components show up in products from the likes of Compaq, Dell and IBM.

While it may be hard to differentiate products within the NIC market, Intel has set itself apart with its advanced silicon designs, industry watchers say.

Intel just introduced the 82559 Ethernet controller, a third-generation product on which the company's Ethernet product line is based. The smaller form of the new controller will make it easier for equipment makers to fit the technology into their products, which makes the 82559 a good bet to show up in lots of corporate network equipment, says Michael Wolf, an analyst at Cahners In-Stat, a Phoenix market research firm.

Intel has also been successful in the market for internetwork gear. In fact, Intel's switch and hub revenue increased fivefold in 1998 from the previous year, according to Cahners In-Stat.

Intel's edge in the internetwork market until now has been lower prices. That, for example, is how the company got Phil Spears, who was consulting for a publishing company, to recommend Intel over Cisco.

"I couldn't hand my client a $300,000 to $400,000 quote for a Cisco system," says Spears, a consultant with Computers for Professionals. "I knew I could get them a similar Intel configuration that wouldn't be quite as glamorous or robust, but would be good enough to carry them for the next four or five years."

The client, Lippincott, Williams & Wilkins, now uses Intel adapters, hubs and switches across its 1,000-user network.

Reaching into its wallet

Intel is trying to ensure that its products stay competitive by acquiring whatever technology is necessary. The company has invested a total of $2.5 billion in more than 200 companies, many in the network market. Last year, Intel pumped $830 million into other companies.

In March, Intel closed its $185 million acquisition of Shiva, a leading vendor of remote access technology. While Shiva struggled in the months before Intel acquired it, the company did generate more than $100 million in remote access revenue last year and has been working on VPN technology that should prove valuable to Intel.

Intel's latest acquisition blockbuster is its $2.2 billion bid for Level One Communications. Intel is after Level One's Gigabit Ethernet silicon technology, which Intel figures will serve the needs of equipment makers supplying telecommunications carriers and ISPs.

Intel is also looking to differentiate itself with new network appliances and single-function boxes, such as the InBusiness eMail Station and Internet Station. These products simplify e-mail exchange and Internet connectivity, respectively, for small companies.

Of course, gaining a foothold in the network industry has not been a cinch for Intel. The company, along with some others, failed in its bid to sell customers on the hub-on-a-board concept during the early '90s. Intel retrenched and came out with stand-alone hubs in 1995.

Intel's Ethernet adapter business has not been without its hitches, either. The company went from zero market share to 15% in its first year in the market, but as a result couldn't keep up with demand and had to scramble to get its products out. Service and support has also been a challenge for Intel's network business group.

"Early on, you had to really work your way through [technicians] before you found one who really knew the product," Spears says. Intel's support staff now matches up well to those of Cisco and 3Com, he says.

Intel has announced plans to shore up its support offerings by delivering a Web-based help desk to serve its consumer and small-business customers.

With an increasingly solid support staff in place and a lot of new technology in the pipeline, Intel is poised to raise its profile in the network market.

"Intel has a clear view of where its products are going, the market it is trying to get a hold of and who it wants to go after," Spears says. ◪

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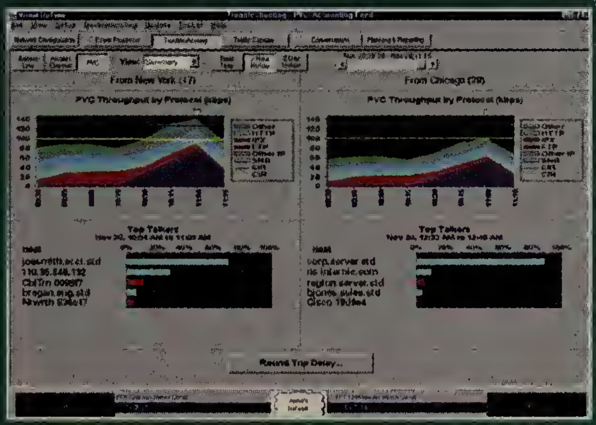

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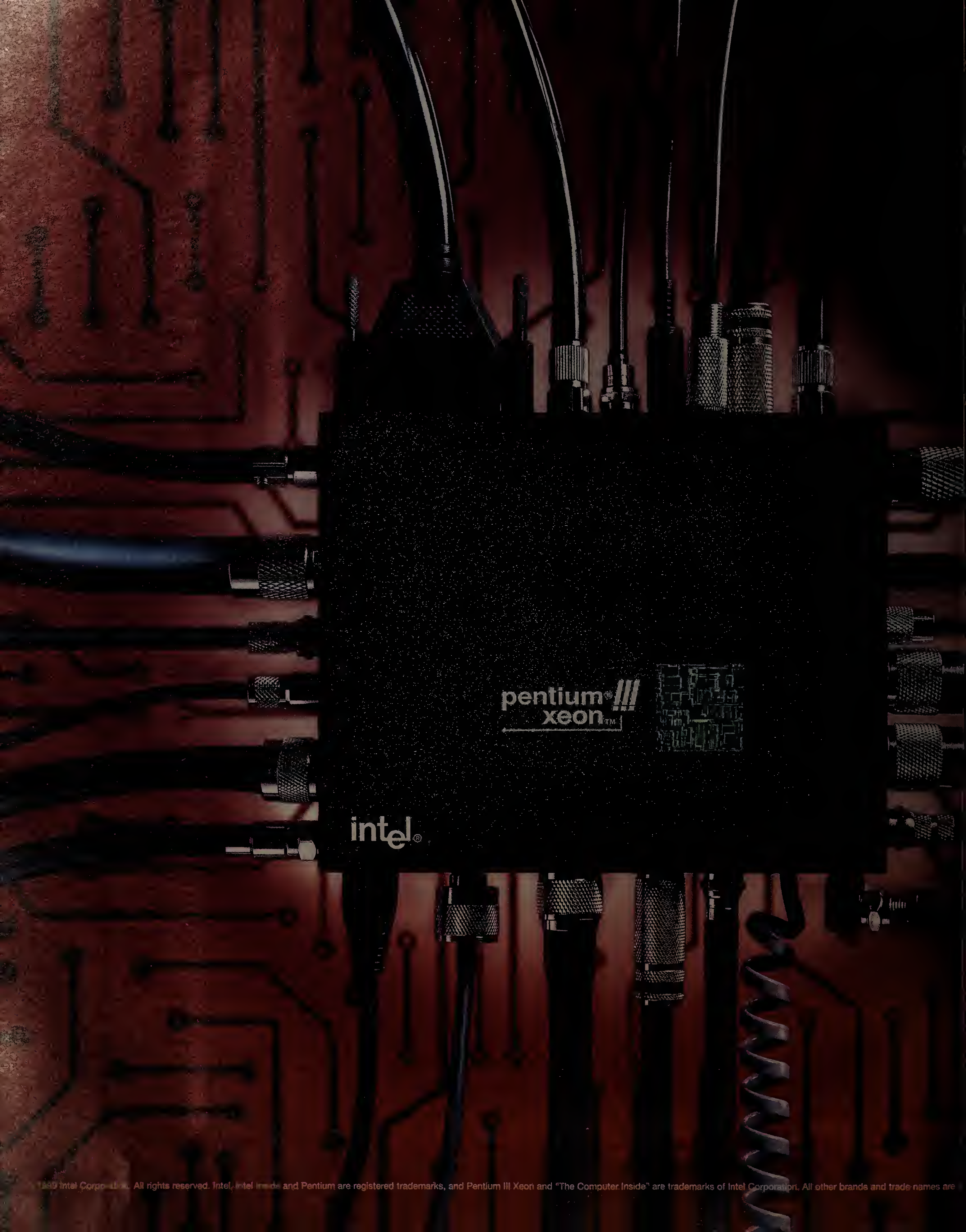

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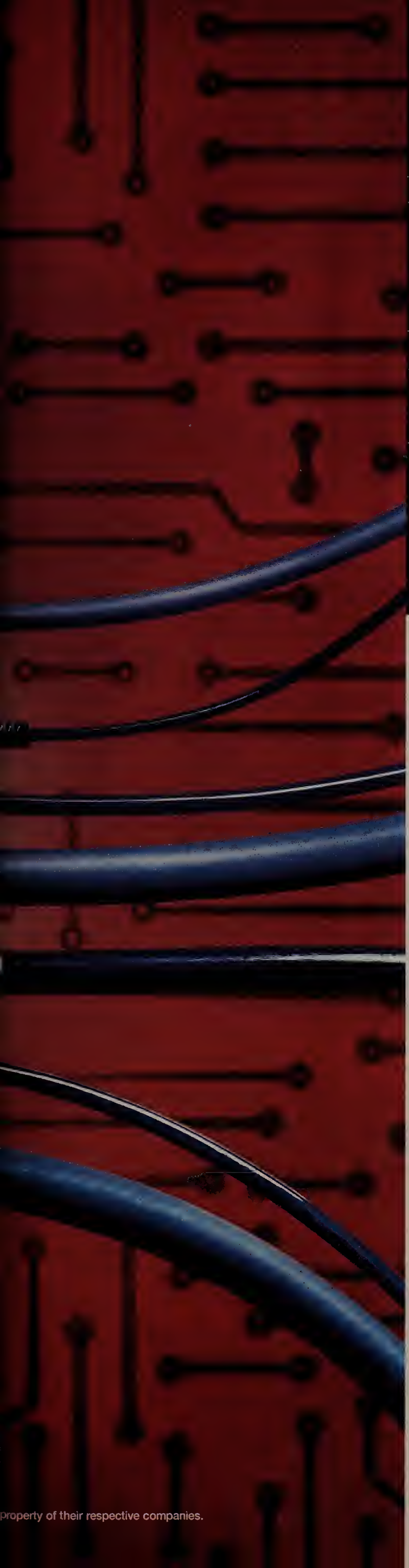

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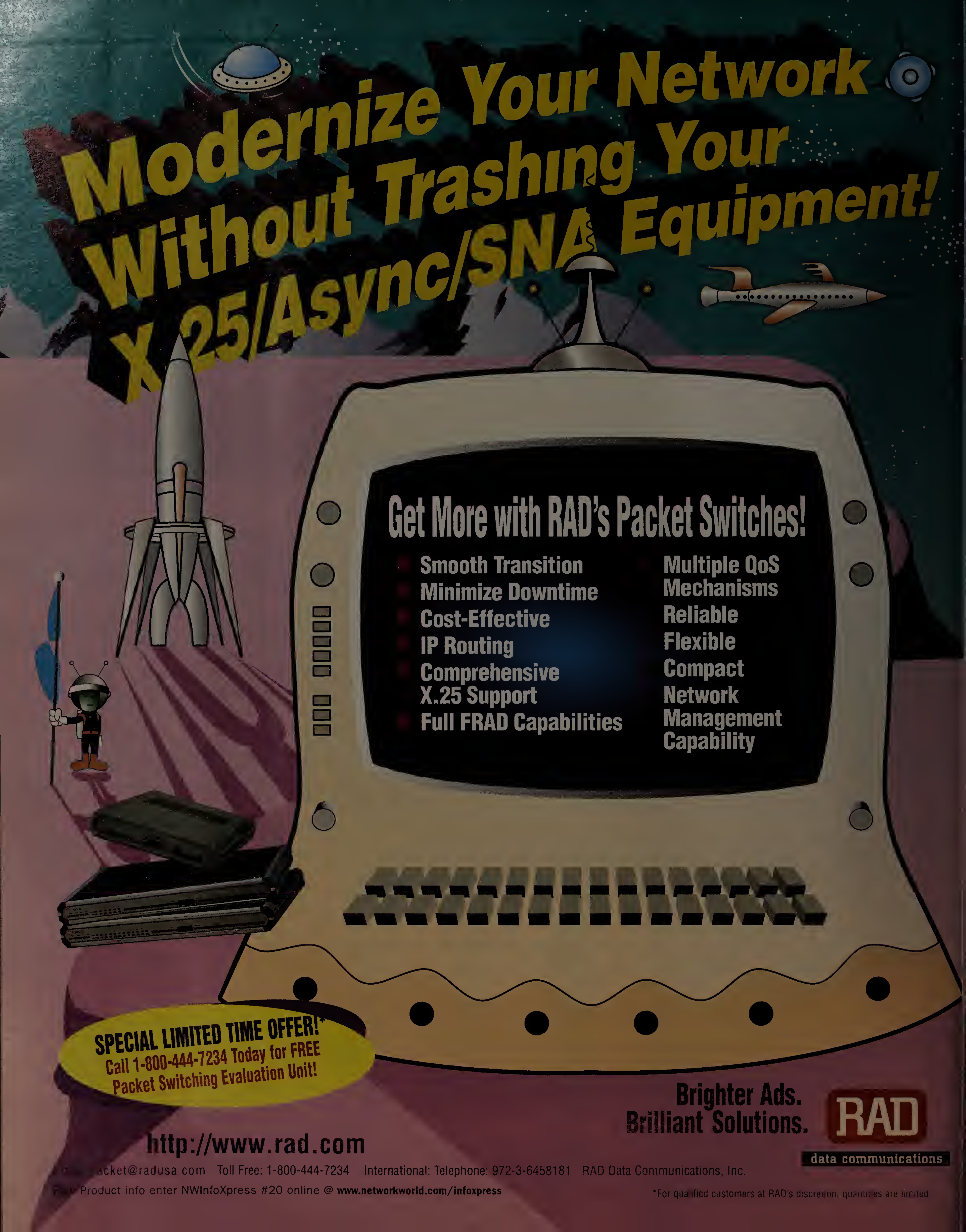

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(check ONE only)

- 01. ☐ Manufacturing (other)
- 02. ☐ Finance/Banking
- 03. ☐ Insurance/Real Estate/Legal
- 04. ☐ Health Care Services
- 05. ☐ Hospitality/Entertainment/Recreation
- 06. ☐ Media/TV/Cable /Radio/Print
- 07. ☐ Retail/Wholesale Trade/Business Services
- 08. ☐ Transportation
- 09. ☐ Utilities
- 10. ☐ Education
- 11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
- 12. ☐ Government (Federal/State/Local)
- 13. ☐ Military
- 14. ☐ Aerospace
- 15. ☐ Consulting (Independent)*
- 16. ☐ Carriers/Interconnects
- 17. ☐ Internet Service Provider (ISP)
- 18. ☐ Manufacturing (Computer/Communications/OEM)
- 19. ☐ Resellers of Computer/Network Products (VARs, VADs)
- 20. ☐ Systems/Network Integrators*
- 21. ☐ Distributors (Computer/Communications)*
- 22. ☐ Other (please specify) ____________________

***** *Please complete form based on largest client.*

2. What is your job function?

(check ONE only)

NETWORK IS MANAGEMENT:

- 1. ☐ Network Management
- 2. ☐ LAN Management
- 3. ☐ Datacom/Telecom Management
- 4. ☐ IS/IT/MIS/CIO/Systems Management
- 5. ☐ Internet/Intranet/Electronic Commerce Mgmt., Webmaster
- 6. ☐ Engineering Management
- 7. ☐ Corporate Management (CEO, Pres., VP, Dir., Mgr., Financial Management)
- 8. ☐ Consultant (Independent)
- 9. ☐ Other ____________________

3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of?

(Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–N.)

- 1. $100 Million or more
- 2. $50 Million to $99.9 Million
- 3. $25 Million to $49.9 Million
- 4. $10 to $24.9 Million
- 5. $1 to $9.9 Million
- 6. $100,000 to $999,999
- 7. $50,000 to $99,999
- 8. Under $50,000
- 9. None of the above

A ______ Large Systems (Mainframes/Minis)
B ______ Desktops (Micros/Laptops/Workstations)
C ______ Servers
D ______ LANs
E ______ WAN Equipment
F ______ Carrier Services
G ______ Internetworking
H ______ Internet
I ______ Intranet
J ______ Extranet
K ______ Remote Access
L ______ Peripherals
M ______ Software
N ______ Service/Support

4. What is the total number of sites for which you have purchase influence?

(check ONE only)

1. ☐ 100+ 2. ☐ 50 – 99 3. ☐ 20 – 49 4. ☐ 10 – 19 5. ☐ 2 – 9 6. ☐ 1 7. ☐ None

5. What is the total number of Servers/Clients/LANs installed/planned at your location/ in your entire organization?

(check ONE box in each column)

SERVERS At Location A		SERVERS Entire Org. B	CLIENTS At Location C		CLIENTS Entire Org. D	LANS At Location E		LANS Entire Org. F
☐	1. 50,000+	☐	☐	1. 50,000+	☐	☐	1. 50,000+	☐
☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐
☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐
☐	4. 100 to 999	☐	☐	4. 100 to 999	☐	☐	4. 100 to 999	☐
☐	5. 50 to 99	☐	☐	5. 50 to 99	☐	☐	5. 50 to 99	☐
☐	6. 10 to 49	☐	☐	6. 10 to 49	☐	☐	6. 10 to 49	☐
☐	7. 1 to 9	☐	☐	7. 1 to 9	☐	☐	7. 1 to 9	☐
☐	8. none	☐	☐	8. none	☐	☐	8. none	☐

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check one only)

- 1. ☐ Corporate/Enterprise
- 2. ☐ Department
- 3. ☐ None

B. Involvement (check ALL that apply)

- 1. ☐ Create Network Strategy
- 2. ☐ Recommend/Specify
- 3. ☐ Approve
- 4. ☐ Evaluate
- 5. ☐ Determine the Need
- 6. ☐ None

7. What is the estimated number of employees at your location/in entire organization?

(check ONE in each section)

A. At your location:

- 1. ☐ Over 20,000
- 2. ☐ 10,000 – 19,999
- 3. ☐ 5,000 – 9,999
- 4. ☐ 2,500 – 4,999
- 5. ☐ 1,000 – 2,499
- 6. ☐ 500 – 999
- 7. ☐ 250 – 499
- 8. ☐ 249 or less

B. Entire organization:

- 1. ☐ Over 20,000
- 2. ☐ 10,000 – 19,999
- 3. ☐ 5,000 – 9,999
- 4. ☐ 2,500 – 4,999
- 5. ☐ 1,000 – 2,499
- 6. ☐ 500 – 999
- 7. ☐ 499 or less

8. Please indicate the products/services that you are currently involved in purchasing or plan to purchase:

(check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

INTERNET/INTRANET

A B

- ☐ 01. ☐ Internet Services/Web Hosting
- ☐ 02. ☐ Firewalls/Security/Encryption
- ☐ 03. ☐ Web Servers/Software
- ☐ 04. ☐ Web Servers/Hardware
- ☐ 05. ☐ TCP/IP Software
- ☐ 06. ☐ Management/Monitoring Software
- ☐ 07. ☐ Voice/Video Over IP
- ☐ 08. ☐ VPN Equipment/Services
- ☐ 09. ☐ Legacy Integration Tools (Web to Host)
- ☐ 10. ☐ Web Development Tools (JAVA, ActiveX, etc.)
- ☐ 11. ☐ Push Technology
- ☐ 12. ☐ Web Browsers
- ☐ 13. ☐ Intranet Applications/Groupware
- ☐ 14. ☐ Search/Retrieval Products (web crawler)
- ☐ 15. ☐ Electronic Commerce Tools
- ☐ 16. ☐ Web Authoring Tools
- ☐ 17. ☐ Other ____________________

LOCAL-AREA NETWORKS/ INTERNETWORKING

A B

- ☐ 18. ☐ Local-Area Networks
- ☐ 19. ☐ Network Operating System Software
- ☐ 20. ☐ Servers
- ☐ 21. ☐ Print Servers
- ☐ 22. ☐ Routers
- ☐ 23. ☐ ATM Switches
- ☐ 24. ☐ Token-Ring Switches
- ☐ 25. ☐ Ethernet Switches
- ☐ 26. ☐ Fast Ethernet
- ☐ 27. ☐ Gigabit Ethernet
- ☐ 28. ☐ Layer 3 Switches
- ☐ 29. ☐ Network Storage Devices (NASs, SANs)
- ☐ 30. ☐ LAN Storage/Backup
- ☐ 31. ☐ Optical Storage/Backup/Jukeboxes
- ☐ 32. ☐ Disk Storage/Backup
- ☐ 33. ☐ Tape Storage/Backup
- ☐ 34. ☐ RAID Storage/Backup
- ☐ 35. ☐ Network Test/Diagnostic Tools
- ☐ 36. ☐ Cables, Connectors, Baluns
- ☐ 37. ☐ UPS
- ☐ 38. ☐ Network Interface Cards (NICs)
- ☐ 39. ☐ Hubs
- ☐ 40. ☐ Intelligent Hubs
- ☐ 41. ☐ Stackable Hubs
- ☐ 42. ☐ Bridge/Router
- ☐ 43. ☐ SNMP Network Management
- ☐ 44. ☐ Gateways
- ☐ 45. ☐ Concentrators/Repeaters
- ☐ 46. ☐ Other (please specify) ____________________

COMPUTERS/PERIPHERALS

A B

- ☐ 47. ☐ Thin Clients/Network Computers (NCs)
- ☐ 48. ☐ Laptops/Notebooks/Sub-Notebooks
- ☐ 49. ☐ Micros/PCs
- ☐ 50. ☐ Minis
- ☐ 51. ☐ Mainframes
- ☐ 52. ☐ Workstations
- ☐ 53. ☐ Printers/Network Printers
- ☐ 54. ☐ CD-ROM/DVD
- ☐ 55. ☐ Fax/Modem Boards
- ☐ 56. ☐ Memory/Chips/Boards/Cards
- ☐ 57. ☐ Other ____________________

REMOTE/WIRELESS COMPUTING

A B

- ☐ 58. ☐ Remote Access Products
- ☐ 59. ☐ Remote Access Services
- ☐ 60. ☐ PDAs
- ☐ 61. ☐ PCMCIA Devices
- ☐ 62. ☐ Wireless Data Equipment/Services
- ☐ 63. ☐ Cellular Equipment & Services
- ☐ 64. ☐ Other (please specify) ____________________

SOFTWARE/APPLICATIONS

A B

- ☐ 65. ☐ Network Management
- ☐ 66. ☐ Systems Management
- ☐ 67. ☐ Security
- ☐ 68. ☐ Communications Software
- ☐ 69. ☐ Terminal Emulation
- ☐ 70. ☐ Operating Systems
- ☐ 71. ☐ Applications Development Tools
- ☐ 72. ☐ Database Management/ RDBMS
- ☐ 73. ☐ Groupware
- ☐ 74. ☐ Workflow
- ☐ 75. ☐ EDI
- ☐ 76. ☐ E-mail
- ☐ 77. ☐ Desktop Videoconferencing
- ☐ 78. ☐ Imaging
- ☐ 79. ☐ Suites/Server Suites (Back Office, etc.)
- ☐ 80. ☐ Middleware
- ☐ 81. ☐ Document Management
- ☐ 82. ☐ Site Metering Tools
- ☐ 83. ☐ Computer Telephony Integration (CTI)
- ☐ 84. ☐ Data Warehousing
- ☐ 85. ☐ Anti Virus Software
- ☐ 86. ☐ Multimedia
- ☐ 87. ☐ Yr. 2000 Conversion Software (Y2K)
- ☐ 88. ☐ Helpdesk
- ☐ 89. ☐ Web Based Management Tools
- ☐ 90. ☐ Directory Services
- ☐ 91. ☐ Other (please specify) ____________________

WIDE-AREA NETWORK EQUIPMENT & SERVICES

A B

- ☐ 92. ☐ 56 Kbps Modems
- ☐ 93. ☐ Under 56 Kbps Modems
- ☐ 94. ☐ Cable Modems
- ☐ 95. ☐ Asynchronous Transfer Mode (ATM)
- ☐ 96. ☐ Frame Relay Equipment/Services
- ☐ 97. ☐ ISDN Equipment & Services
- ☐ 98. ☐ FT-1/T-1/T-3 Multiplexers/Services
- ☐ 99. ☐ xDSL Services/Products
- ☐ 100. ☐ Diagnostic/Test Equipment
- ☐ 101. ☐ DSU/CSU
- ☐ 102. ☐ PBXs
- ☐ 103. ☐ Videoconferencing
- ☐ 104. ☐ Leased Lines
- ☐ 105. ☐ Switched Data
- ☐ 106. ☐ Virtual Private Networks (VPN)
- ☐ 107. ☐ FRADs
- ☐ 108. ☐ Managed LAN/Router Services
- ☐ 109. ☐ Other ____________________
- ☐ 110. ☐ Outsourcing/Systems Integration Services
- ☐ 111. ☐ Education/Training Services
- ☐ 112. ☐ None of the above (1–111)

9. Please indicate the platforms that are currently installed/planned:

(check ALL that apply)

A. Currently installed B. Planned for purchase

NETWORK PROTOCOLS

A B

- ☐ 01. ☐ TCP/IP
- ☐ 02. ☐ IPv6
- ☐ 03. ☐ SNA
- ☐ 04. ☐ Novell IPX/SPX
- ☐ 05. ☐ APPC/APPN/LU 6.2
- ☐ 06. ☐ NETBIOS
- ☐ 07. ☐ NFS
- ☐ 08. ☐ SNMP
- ☐ 09. ☐ Other ____________________

LAN ENVIRONMENT

A B

- ☐ 10. ☐ Gigabit Ethernet
- ☐ 11. ☐ Switched Ethernet
- ☐ 12. ☐ Fast Ethernet (100 Megabit Ethernet)
- ☐ 13. ☐ Ethernet
- ☐ 14. ☐ ATM
- ☐ 15. ☐ Token Ring/Token Ring Switching
- ☐ 16. ☐ IP Switching
- ☐ 17. ☐ Layer 3 Switching
- ☐ 18. ☐ FDDI
- ☐ 19. ☐ 100Base-T
- ☐ 20. ☐ 10Base-T
- ☐ 21. ☐ Fibre Channel
- ☐ 22. ☐ Other ____________________

NETWORK OPERATING SYSTEM

A B

- ☐ 23. ☐ Windows NT
- ☐ 24. ☐ Windows NT/Advanced Server
- ☐ 25. ☐ Novell IntranetWare
- ☐ 26. ☐ Novell (NetWare 5.X)
- ☐ 27. ☐ Novell (NetWare 4.X)
- ☐ 28. ☐ Novell (NetWare 2.X, 3.X)
- ☐ 29. ☐ Microsoft (LAN Manager)
- ☐ 30. ☐ Banyan (VINES)
- ☐ 31. ☐ IBM (Server)
- ☐ 32. ☐ Other (please specify) ____________________

COMPUTER OPERATING SYSTEM

A B

- ☐ 33. ☐ NT Server
- ☐ 34. ☐ NT Workstation
- ☐ 35. ☐ Unix/Xenix/AIX/SCO
- ☐ 36. ☐ Solaris
- ☐ 37. ☐ Windows
- ☐ 38. ☐ Windows 95
- ☐ 39. ☐ Windows 98, .9x
- ☐ 40. ☐ DOS
- ☐ 41. ☐ OS/2, OS/2 Warp
- ☐ 42. ☐ IBM MVS/VM/VSE
- ☐ 43. ☐ Digital VMS
- ☐ 44. ☐ Macintosh
- ☐ 45. ☐ Other ____________________
- ☐ 46. ☐ None of the above (1–45)

10. Which of the following Servers/Clients do you have installed/planned at your location?

(check ALL that apply in each column)

	A. Servers		B. Clients		A. Servers		B. Clients
Power PC	☐	01.	☐	486, 386, 286	☐	07.	☐
Power Mac	☐	02.	☐	Sun Sparc	☐	08.	☐
Mac Other	☐	03.	☐	Risc	☐	09.	☐
Multiprocessor Servers	☐	04.	☐	Alpha	☐	10.	☐
Pentium II (PII)	☐	05.	☐	Other	☐	11.	☐
Pentium/Pentium Pro	☐	06.	☐				

11. Which of the following hardware platforms are installed/planned in your company?

(check ALL that apply)

A - Mainframes (Large Scale)

- 1. ☐ IBM
- 2. ☐ Amdahl
- 3. ☐ Cray
- 4. ☐ Hitachi
- 5. ☐ Unisys
- 6. ☐ Other ____________________

B - Minis (Midrange)

- 1. ☐ IBM RS/6000
- 2. ☐ IBM AS/400
- 3. ☐ Digital
- 4. ☐ Tandem
- 5. ☐ Unisys
- 6. ☐ AT&T GIS
- 7. ☐ H-P
- 8. ☐ Data General
- 9. ☐ Other ____________________

C - Workstations

- 1. ☐ Sun Microsystems
- 2. ☐ Silicon Graphics
- 3. ☐ Digital
- 4. ☐ H-P
- 5. ☐ IBM
- 6. ☐ Other ____________________

12. What is the estimated gross revenue of your entire company/institution?

(check ONE only)

- 01. ☐ $20 billion or more
- 02. ☐ $10 billion to $19.9 billion
- 03. ☐ $1 billion to $9.9 billion
- 04. ☐ $500 million to $999.9 million
- 05. ☐ $100 million to $499.9 million
- 06. ☐ $50 million to $99.9 million
- 07. ☐ $10 million to $49.9 million
- 08. ☐ $5 million to $9.9 million
- 09. ☐ $4.9 million or less
- 10. ☐ None of the above

13. For which areas outside of North America do you have purchase influence?

(check ALL that apply)

1. ☐ Europe 2. ☐ Asia 3. ☐ South America 4. ☐ Australia 5. ☐ Middle East 6. ☐ None

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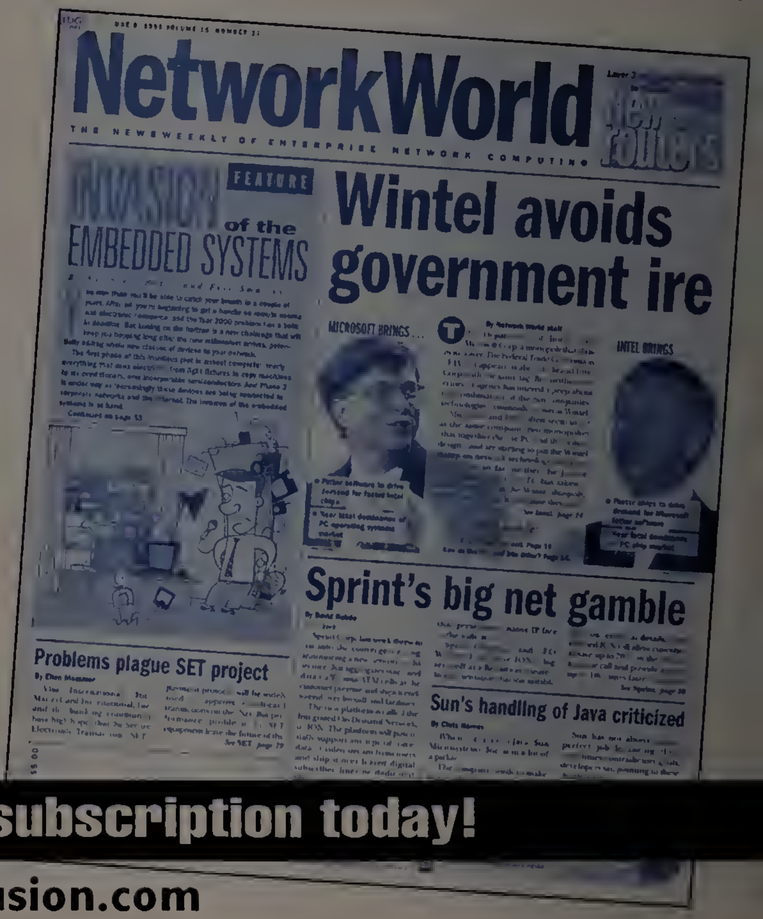

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Briefs

With an eye to expanding its customer relationship software family, **Lucent** last week acquired **Mosaix,** a call center software maker, in a stock deal valued at about $145 million. Particularly attractive to Lucent is Mosaix's ViewStar software, which automates and streamlines customer requests. Lucent also wanted the full Mosaix product line, including software that handles outbound calls from call centers and agent effectiveness tools for training and scripting.

Cerulean Technology last week announced MobileFusion application server. The server lets users make intranet applications available to their mobile work force through Cellular Digital Packet Data, microwave or satellite wireless services. MobileFusion runs on a Windows NT server and can be integrated with any Open Database Connectivity database or Post Office Protocol 3 mail system, and Microsoft Exchange. MobileFusion users will be able to access corporate information from a laptop, personal digital assistant or palm top running the Windows CE operating system. MobileFusion is slated for availability in the second quarter for $750 per user.

Cerulean: (508) 460-4000

GTE Internetworking introduced its GTE Security Advantage service last week. A fully managed security offering, GTE Security Advantage uses WatchGuard Technologies' LiveSecurity hardware and software system to offer business users with 50 to 500 employees 24-7 security services. The service also supports the IETF's IP Security protocol with 128-bit key encryption and digital certificates. GTE Security Advantage is available now for $795 to $1,095.

GTE: (617) 873-2000

FCC ups charge for second phone line

BY DAVID ROHDE

WASHINGTON, D.C. — The government has made it official: The federally mandated monthly charges on separate Internet access phone lines will be higher than charges for primary telephone links for telecommuters and small-office workers.

The Federal Communications Commission last month ruled that only the first phone line in a person's residence or small-office location is eligible for the lowest possible monthly Subscriber Line Charge (SLC) of $3.50. The monthly fees for all other phone lines will be higher, and will depend on the type of location (see chart).

The FCC's latest rule is airtight. The regulators said the rule will be "location-based," which means that even if members of several different households live in one location, that location gets only one primary line at the lowest rate.

As a result, telecommuters who live in multitenant or group homes — or their employers — could have to pay higher fees even for their first phone line, whether they use it for phone calls, online access or both.

The SLC is a fee that has appeared on users' bills ever since the breakup of AT&T in 1984.

The purpose of the SLC is to partially compensate regional Bell operating companies and other local exchange carriers for the cost of terminating long-distance carriers' calls.

The FCC said its decision on SLC was mostly a matter of practicality. The agency had considered allowing each person in multitenant locations — for example, several single people living together — to get their own primary lines at the $3.50 per month rate.

But that would have created administrative headaches because local carriers would have had to ask all their customers to certify whether all the people living in one location are related or not. That also presented privacy concerns, the FCC said.

Several carriers, such as AT&T and MCI WorldCom, urged the FCC to eliminate the distinction between primary and additional telephone lines and come up with a number — presumably a little more than $3.50 per month — to set as the SLC on all residential lines. But the FCC rejected the idea because it said the SLC for the first phone line should be as low as possible, to help ensure universal service.

The FCC did have some good news for users, though. An FCC staffer said the agency is likely to extend its current rule charging only one SLC on an ISDN Basic Rate Interface to digital subscriber lines as well. ◪

The cost of doing business

How the federally mandated per-line charges now stand:

Type of line	Monthly Subscriber Line Charge	Monthly PICC charge*
First residential line	$3.50	$0.53
Additional residential lines	$6.07	$1.50
Business lines**	$9.20	$2.75

* Technically, local carriers levy a PICC on long-distance carriers, but as a practical matter it is usually passed along to the user.

** Business locations with only one phone line are granted an exception and pay the same rates as the first residential line.

Note: All figures are maximum charges. Carriers may charge up to these amounts, though some charge less.

SOURCE: FCC, WASHINGTON, D.C.

VPNet offers more than just hardware

New service offers VPN design, installation and monitoring.

BY TIM GREENE

SAN JOSE — If you need a vendor to take care of all your virtual private network (VPN) needs, from planning to installation to help desk, then VPNet Technologies may be able to help.

Known as a maker of Internet VPN hardware, VPNet has announced a service called VPNsure, which plans, designs, installs and monitors VPNs.

The service is designed to bail out overworked IS departments that want to build VPNs but don't have the staff to handle the projects and keep up with their other work, according to Joe Turner, associate director of MIS at Fitchburg State College in Fitchburg, Mass. He recently installed a remote access Internet VPN at the school.

"Some companies don't really have network gurus of their own," Turner says. "They rely on the service provider to handle their network upgrades. It's not a snap for everybody."

VPNsure relies on partnerships with experts from other areas. For example, starting in June, IBM Global Services will offer VPN consulting and installation in the U.S. and 25 other countries under the VPNsure moniker.

VPNsure comprises two parts — Planning Services and Support Services. VPNsure Planning Services includes a package of general VPN guidelines, design of individual customers' networks and technical training on VPNet gear.

Support Services includes deciding what application service quality customers need and configuring VPNet devices with existing routers and firewalls. The consultation costs $1,500 to $2,000 per day.

VPNsure Support Services includes installation, integration and use. Cost is $1,200 per site. Help desk services are negotiated with each customer based on the level of service the customer wants.

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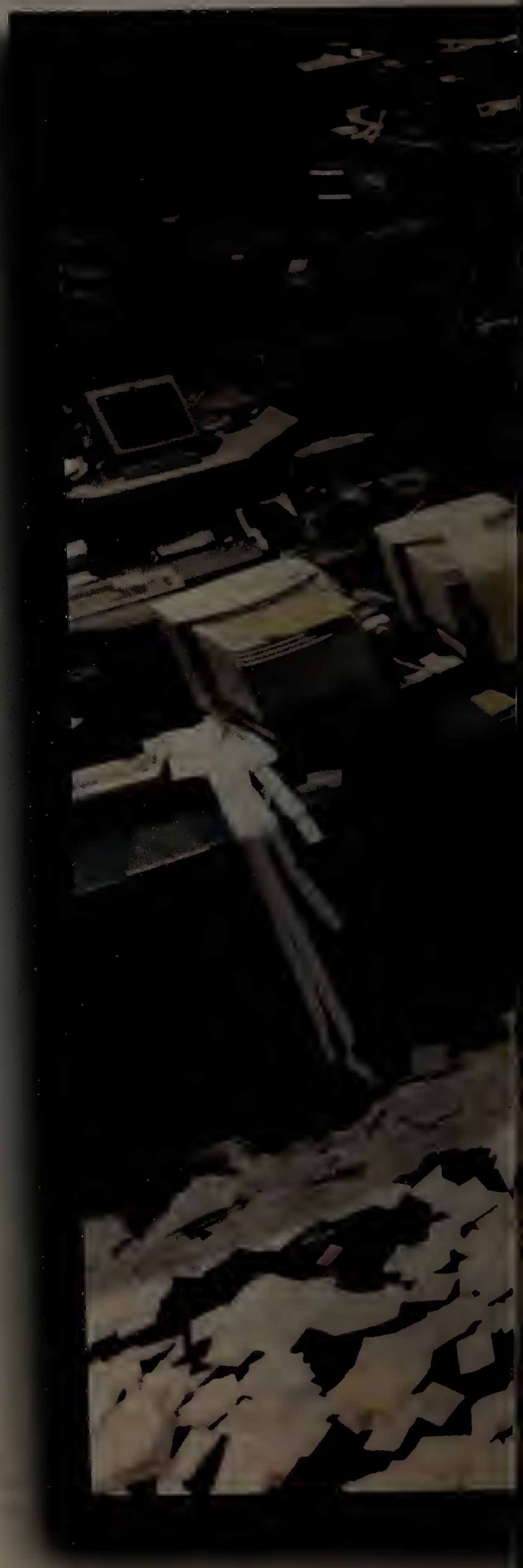

The sun never sets on the global marketplace. Especially for a major business news wire that reports the latest breaking financial news to business leaders in 24 countries. So it's no accident that it relies on a Cisco Powered Network™ service provider. Welcome to the New World — where Cisco Powered Network service providers are changing the way people share ideas and information in extraordinary ways. Impressive, but not surprising when you consider that virtually all Internet traffic in

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Wan Monitor . Daniel Briere and Christine Heckart

NEW SERVICES SET MIS DEPARTMENTS FREE

The application service provider and broadband-enabled ASP movement could, and hopefully will, spark a significant revolution in the network and computing business.

There are several ASP service models beginning to emerge. To broadly generalize, these service models would support:

- Software distribution and revision management
- Network-centric applications and computing
- Creation and delivery of intranets and extranets

Most MIS directors and their staffs listen to the ASP pitch and think, "Wait a minute! This means I'm out of a job." On the contrary. We argue that it is the ASP movement that will get MIS out of the tactical trenches and into the boardroom.

When we explain ASP functions to MIS people, many times their first reaction is, "What will MIS be needed for? What will happen to all these darn PCs we've spent a gazillion dollars on? Let's bury this deep and make sure it never sees the light of day with management."

But wait. What if you didn't have to respond to a million desktop catastrophes per week? What if you didn't have to continually load software and manage the revisions and virus protection? What if you had somebody else to worry about how to implement PeopleSoft applications or e-commerce? What could you do then?

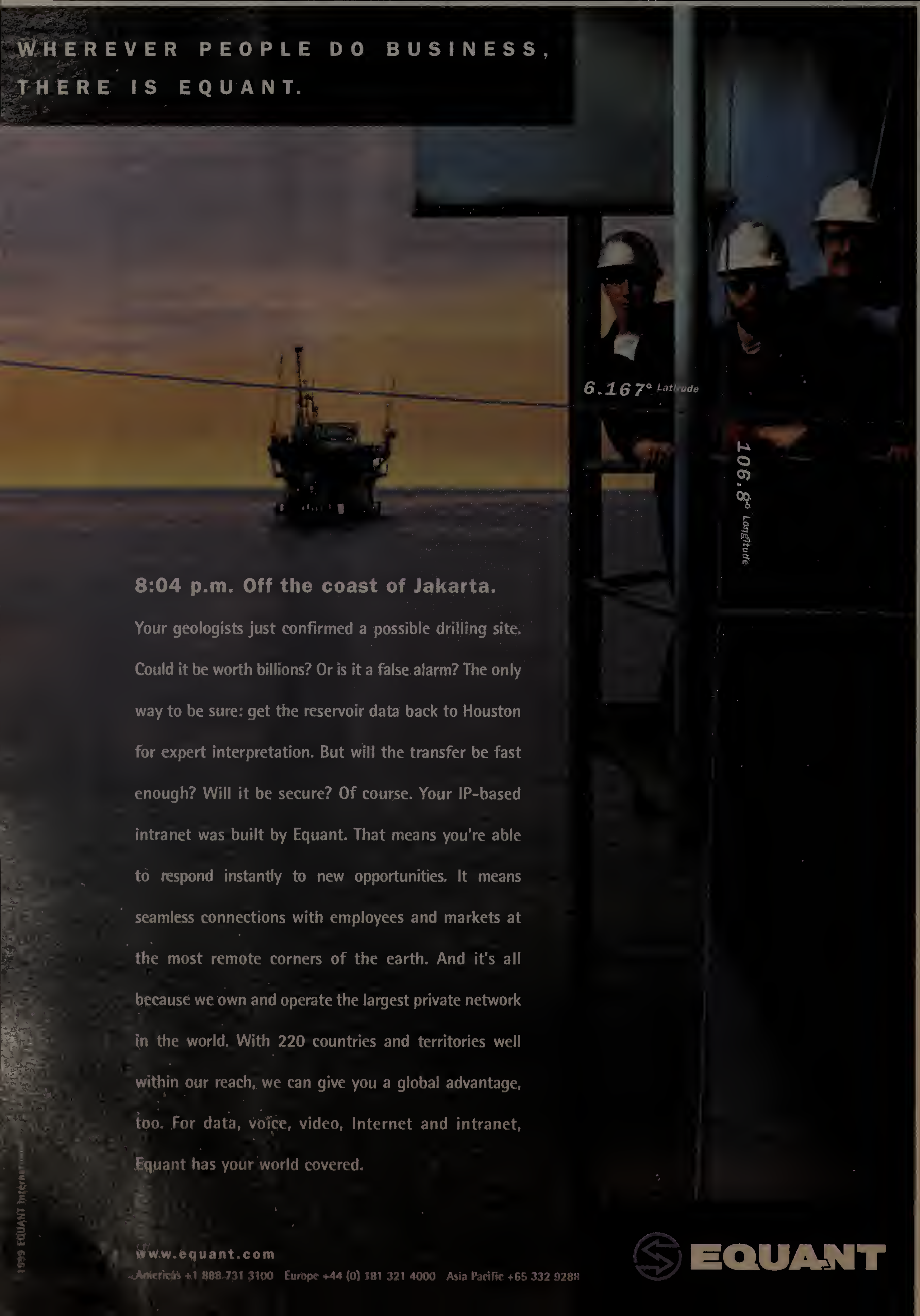
Maybe the MIS department would be tasked with planning the near and long-term strategy of the company and making recommendations for how the network could facilitate that plan. Or maybe MIS could help improve the business strategy after brainstorming about how the intranet or extranet could provide competitive advantages, lower costs or give access to new markets.

Maybe, instead of having a list of 50 prioritized projects, MIS could develop and present the company with 50 new ideas on how the network could create new revenue, new opportunity or more profit for the company.

This would be a cool job! There are a few companies that invite MIS into the boardroom and ask for input on the company's strategy. Some consider MIS to be so strategic that they don't make a major move before MIS is informed and signs on. Unfortunately, in most companies the MIS asset is completely overworked and under-used.

The ASP approach could emancipate the MIS department — provide liberation, freedom and power. Yes, it requires that you do networking in a completely new way. It requires that you relinquish control of some things so that you can control others. While it won't get MIS out of every tactical problem or daily operation, it will dramatically elevate the strategic role MIS plays in the organization, and could contribute to greater success and profits for your company. The real question is: Do you have the guts and the vision to make the change?

Briere is president and Heckart is vice president of TeleChoice, a consultancy in Boston. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.



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Briefs

Axent Technologies has purchased **PassGo Technologies,** the British provider of single sign-on and password synchronization products, for about $50 million. Axent indicated it would support both the PassGo and Axent single sign-on products for the near future and would eventually integrate PassGo into the Axent management framework.

Sen. John McCain (R-Ariz.) says he will soon introduce the Protect Act. This bill would allow the export of 64-bit key encryption and create an Encryption Export Advisory Board to review applications for exemption from regulations against stronger encryption, and make recommendations to the U.S. Department of Commerce. **Americans for Computer Privacy,** which is fighting to end encryption export regulations, says "the bill doesn't go as far as the Security and Freedom through Encryption Act." The SAFE bill has 248 co-sponsors in the U.S. House of Representatives and was recently approved by the House Judiciary Committee.

McCain: Backs export of encryption

JetForm Corp. in Ottawa this week will release an upgrade of its InTempo workflow engine. InTempo 4.0 includes a customizable Web-enabled work list feature, self-service tracking, graphical reporting and integration with Microsoft's Internet Explorer, Internet Information Server, Windows NT, SQL Server, Exchange Server and Management Console. InTempo 4.0 pricing begins at $20,000 for 100 users.

JetForm: (613) 230-3676

IN-SITE: *Lessons from Leading Users*

VRML lets CAD users share

BY ELLEN MESSMER

For decades, Siemens Power Generation Group (KWU) has designed nuclear power plants the old-fashioned way: with basic engineering tools and computer-aided design systems. But for its latest project, called the European Pressurized Water Reactor, Siemens' technical and commercial organization jazzed up the process by collaborating with its partners over the Internet.

The organization's members use incompatible computer-based CAD systems. So Siemens KWU, with help from a German think tank, devised a way to convert 3-D CAD models to Virtual Reality Modeling Language (VRML) 2.0 files that can be read with a Web browser.

Once the files were in a common format, Siemens KWU needed to put the designs on a Web server that could be accessed remotely. But network-based file sharing was not secure enough for the sensitive power-plant data.

Realizing this, Siemens KWU adopted several security measures, such as digital certificates and encryption, to protect access to the 3-D images and text.

Choosing a Web server was also critical, as it would be a disaster if someone broke into the server to steal or alter files, says Wolfgang Gries, a Siemens KWU network security officer. The organization chose Hewlett-Packard's Praesidium VirtualVault Web server. "I looked at a lot of products, but VirtualVault was the only tool I found for what we needed," Gries says.

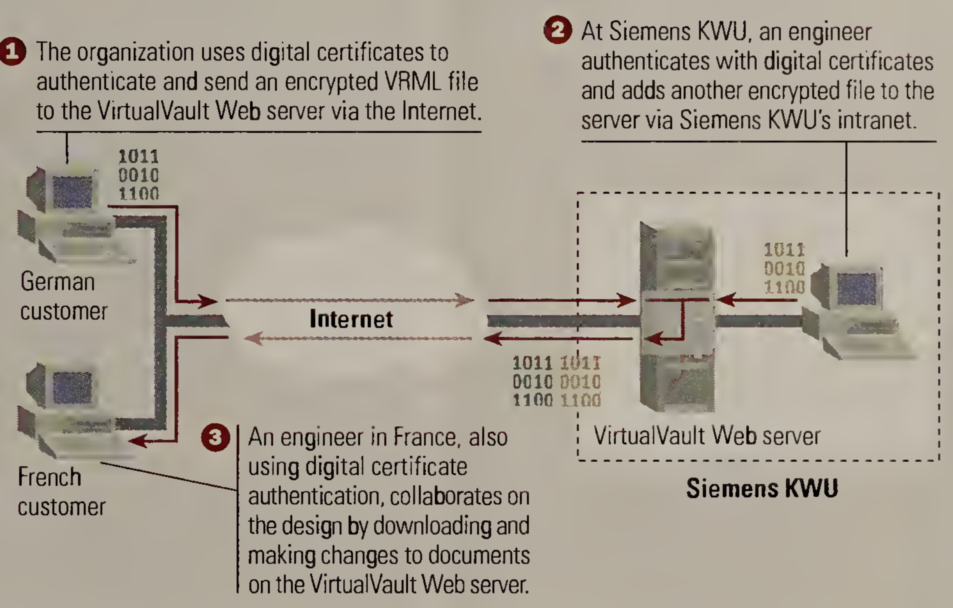
VirtualVault compartmentalizes applications so users can't access protected files. After an engineer's identity is checked at the server, traffic is encrypted between VirtualVault and the engineer's workstation. This authentication is done by Netscape digital certificates.

Hundreds of engineers have received the VRML interactive design system since it was put online last fall, saving millions of dollars in the cost of drawings alone, Gries says.

Gries thinks the project could shave a year off the usual power-plant design time. ◪

International Web collaboration

How Siemens KWU uses the Web for collaborative engineering design.



① The organization uses digital certificates to authenticate and send an encrypted VRML file to the VirtualVault Web server via the Internet.

② At Siemens KWU, an engineer authenticates with digital certificates and adds another encrypted file to the server via Siemens KWU's intranet.

③ An engineer in France, also using digital certificate authentication, collaborates on the design by downloading and making changes to documents on the VirtualVault Web server.

Caching bake-off leaves sour taste

BY ROBIN SCHREIER HOHMAN

SAN DIEGO — InfoLibria was the winner in the first vendor-neutral caching benchmark test held at the University of California San Diego, although Novell made a strong showing with its beta Internet Caching System software running on a Dell server. Both companies were guaranteed a decent ranking after five participants dropped out.

The test was held in mid-March, and the results were announced last week. It was sponsored by the IRCACHE caching research project, which is run by the National Laboratory for Applied Network Research.

All the major caching vendors — Inktomi, InfoLibria, CacheFlow, Network Appliance, IBM, Cisco, Novell and start-up Entera — said they would participate. But only offerings from InfoLibria, Novell, the University of Wisconsin and the freeware Squid wound up with test scores. CacheFlow, Inktomi and Cisco dropped out before the testing started, and IBM and Network Appliance took a "bail-out" option and declined to have their test scores reported.

Both InfoLibria and Novell/Dell entered two caching products. InfoLibria's numbers were highest: a maximum sustained throughput of 1,680 requests per second, with a mean response time of 1.4 to 4.2 seconds. Novell/Dell was a close second: 1,500 requests per second, with a mean response time of 1.4 to 1.7 seconds. Novell is claiming victory on a price/performance ratio because its entry costs about $50,000 vs. InfoLibria's $200,000.

Meanwhile, the vendors that dropped out were busy explaining their decisions.

"We didn't want to disclose our detailed performance numbers to our major competitors," says Edward Sharp of Network Appliance.

"We don't think bake-off processes where all the vendors are thrown into a room ... with a tool that isn't completely verified and matured is an appropriate way to start a benchmarking effort," says Ed Haslam of Inktomi.

"We felt that it was premature for us ... to participate in that simply because it had not matured enough to represent what we think our customers will need," says R. Vasu Devan of CacheFlow. ◪

The business of network management

BY JEFF CARUSO

SAN FRANCISCO — Network management is beginning to be less about managing technology and more about dollars and cents.

That's the consensus coming from a recent roundtable hosted by *Network World*, where network managers and vendors aired the issues surrounding today's network management software — and said what they really thought of each other.

The roundtable involved customers who attended *Network World's* Town Meeting: "Practical Solutions to Managing Enterprise Networks" in San Francisco, as well as representatives from vendors that sponsored the event.

Marin County Network Analyst Laurie Childers still uses ping and telnet more than any other tools.

Network managers from Pacific Gas & Electric and California's Marin and San Mateo counties stuck around after the Town Meeting to talk turkey with representatives from 3Com, Concord, INS, Micromuse, NetScout and Tivoli. The network managers said they need tools that are easy to use and that help them clearly demonstrate to their executives what exactly is going on in their networks. At the same time, they find it hard to justify the cost of management tools to those who hold the purse strings.

"We've been trying to justify a network management system to managers for years," said Rick Chezik, a network engineer for the County of San Mateo.

The vendors, on the other hand, expressed frustration with many users' lack of knowledge about what management tools are available — and how their cost *can* be justified.

But many organizations are still wrestling with the idea that networks are becoming crucial to making money and doing business. The business benefits of managing those networks must be made painfully obvious to upper management, the roundtable participants said.

Pacific Gas & Electric sells electricity by making bids via a network application provided by the state, explained Steven Butler, a network specialist. "We have performance problems with that application where sometimes we come close to not being able to sell electricity, which could amount to anywhere from tens of thousands to millions of dollars in lost revenue," he says.

Even with such a great potential for losses, Butler said he doesn't have the tools to ensure that the network is running as it should.

The vendors also said they see pushback from company executives. It was especially evident in the investment bank market several years ago, said Richard Whitehead, vice president of strategic technologies at Micromuse. Despite the fact that it would only take two minutes of downtime in the investment bank business to justify the cost of Micromuse's product, those companies wouldn't buy it.

"It's like insurance," Whitehead said. "They hadn't actually spent that money. It was a potential loss of money. That [attitude] changed dramatically the first time they had a network outage that lost them an hour."

"Don't forget the component of lost productivity because of network downtime," said Prasad Pammidimukkala, senior product manager at 3Com. Losing the productivity of a hundred users for two hours can be costly, he added.

Draw me a picture

The network managers in the roundtable said they need hard data to show end users and upper management how the network is performing. Web-based reporting might be the answer, said Laurie Childers, principal network analyst for Marin County. "Right now, [end users] have nothing to really look at," she said.

San Mateo County's Rick Chezik says it's tough to get funds for a network management system.

End users tend to remember the last bad thing that happened — the last time the network had problems, said Jim Herman, vice president of Northeast Consulting Resources. Getting Web-based reports in front of the end users shows them that most of the time the network performs well.

To generate those reports in the first place, however, companies need to start measuring their networks' performance, said Jim McQuaid, director of product management at NetScout. "Put in any kind of measurement tool you can get," he said.

Without such tools, end users will expect the network to deliver perfect service all the time, he said.

Bang for the buck

Network managers should focus on specific areas of their network first, said Brian Burba, product marketing manager at Concord. "Build a return on investment just around one piece and justify the [performance measurement] product in this narrow area," he said. Once the product shows where networks are congested or overprovisioned, network managers can extend the product to other parts of their networks.

One function of network management that is easy to justify is software distribution, the participants said. "I have Windows NT servers in power plants," Pacific Gas & Electric's Butler said. "When it comes time to upgrade the operating system, I've got to hire a specialist to drive around for two months and install the upgrades."

"You're starting to build your business case" for a software distribution tool, replied Leo Cole, director of network management at Tivoli. The cost of the labor involved in the upgrade can be weighed against the cost of a software distribution system.

He added that companies should evaluate network management software on the return on investment of individual functions. He said that vendors sometimes make the mistake of focusing on their overall frameworks, rather than leading with the specific functions — such as software distribution — around which users can build a business case.

Where the action isn't

Hot network management technologies, such as the Common Information Model (CIM), Web-based management and service-level management, aren't really important — unless they can be tied as directly as possible to the bottom line, the users said.

While the vendors at the roundtable were enthusiastic about the long-term benefits of CIM, they disagreed about how useful CIM is today. CIM is a standard under development by the Desktop Management Task Force that should allow network management applications to share data more effectively.

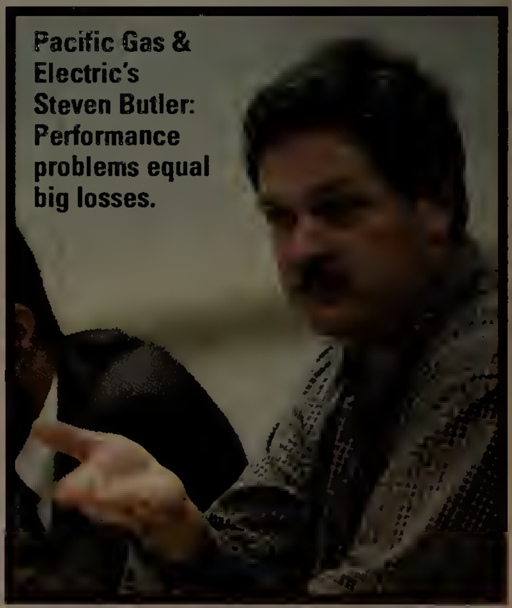
The industry hasn't implemented CIM enough for it to be useful yet, said Wayne Heffner, field program manager at INS, who cautioned against assuming that the applications can share data today. "I think what we've done is define the end state," he said.

"I don't understand why you're trying to convince people that this thing isn't real," Northeast Consulting Resources' Herman retorted. "You're doing the industry a disservice by saying it's just defined recently and it isn't here yet."

"What's going to happen is I'm going to walk into a client site, and they're going to say, 'I just bought NetView, I bought Concord and I got Micromuse — and everybody said CIM's here, so make it work together,'" Heffner said. "I can't do that."

He added that CIM probably will be more useful in 12 to 18 months.

The network managers watched the CIM discussion with detached interest, saying they'll wait to see how CIM develops. Meanwhile, they have problems to deal with today, using the best tools they can get.



Pacific Gas & Electric's Steven Butler: Performance problems equal big losses.

"I still use ping and telnet more than anything," Marin County's Childers said, referring to two free management utilities. "I like them, I trust them, and I know how to use them." ◪

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'Net Insider . Scott Bradner

IVY-COVERED BITS?

It seems that there will soon be no need for the hallowed halls of academe.

The New York Times reported in a special "Education Life" supplement on April 4 that at least one management guru (Peter Drucker) predicts that: "30 years from now, the big university campuses will be relics."

The scenario is that modern technology, particularly the Internet, will cause such a shift in distance learning that there will be nobody needed to cut the grass for commencement. I could not tell from the article how much the author accepted this, but I have quite a hard time with it.

Distance education is far from new. There have been correspondence schools since who knows when, and educational TV stations have been broadcasting lectures for decades. But the idea of distance learning is certainly now in vogue, with the Internet seen as the grand facilitator.

Just about every university is trying to figure out what to do in this area, at minimum as a protective measure — to see what effect the distance-learning initiatives of others will have on them. The largest distance-learning efforts under way are Western Governors University, a consortium of 17 states plus Guam, and the Open University, a 29-year-old project of the BBC.

But if one steps back a bit, away from the enchantment with the technology, the future gets a bit more difficult to predict. It seems clear that some types of education are very well suited to distance learning. Continuing education for doctors and dentists, which is required in many states, and special classes that vendors hold to teach people to use their products, seem to be ideal. Students can take them when they want to and only take the ones they need, and they can do so without traveling.

On the other hand, I find it very hard to believe that four years of undergraduate education obtained while sitting in front of a PC in your home can in any way substitute for the social and intellectual interaction of the same four years spent on a college campus dealing with classmates and professors.

But there is another whole area of issues that will make it very hard for most of today's universities to jump into the distance-learning business. It will take years, for example, to figure out ways of providing incentives for professors to put together the online lessons and to work out the intellectual property rights for all the materials used in the classroom.

So I'm not worried that Harvard will fade away any time soon (even though my Harvard Extension School class is on the 'Net).

Disclaimer: Brand-namewise, Harvard might have a head start in the area of distance learning, but the above are my own musings.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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Siemens rocks messaging boat

BY PAUL MCNAMARA

BOCA RATON, FLA. — A new unified messaging server from Siemens will let Microsoft Exchange/Outlook users manage their e-mail, voice mail and fax from a PC, telephone or personal digital assistant, while giving network managers the advantages of a single message store and standards support.

The Xpressions 470 family of unified messaging products works with Siemens' PhoneMail voice messaging platform. While the first version supports only Microsoft messaging, Xpressions will ultimately come in versions for Lotus Notes and Novell GroupWise, the company says. The first release is a hardware/software combination, but software-only versions are planned.

According to Siemens, the new product's modular design allows companies to selectively give users access to voice, e-mail or fax services. The first two models are Xpressions 472, which supports workgroups needing between four and 16 voice sessions, and, Xpressions 475, which supports up to 48 voice sessions.

One industry expert says the Siemens announcement is indicative of the maturation that is occurring in the unified messaging marketplace, which includes vendors such as Octel, AVT and Active Voice.

"We're moving toward putting together the pieces in a way that allows this kind of technology to finally work effectively, and Siemens is clearly doing some very good things along that line," says Don Van Doren, president of Vanguard Communications Corp., a consulting company in Morris Plains, N.J.

The Xpressions 470 family lets Exchange and Outlook users manage voice and fax mail.

The market is not as mature as the products. "Having the technology in place is one thing. The real challenge here is: Is the market ready?" Van Doren says.

Not quite, he says. "The concept of unified messaging is something that, long term, makes a lot of sense, and we're going to get there," he says. "We see it as slow going for another year, at least."

Available in June, Xpressions will cost between $100 and $300 per mailbox, depending on system size and features.

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Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Ask Dr. Intranet

By Steve Blass

I'm searching for an inexpensive network monitoring tool for our intranet.
Via the Internet

There's a great graphical network monitoring tool for Unix called Scotty, available at wwwhome.cs.utwente.nl/~schoenw/scotty/. Scotty contains a Unix Tcl extension for access to network management information and the graphic network editor. Under most Unix systems, Scotty compiles and runs out of the box.

Under Windows NT, the Tcl extension works except for the Internet Control Message Protocol commands. But the graphic network editor is challenged by lack of fileevent support in the NT version of Tcl.

We will soon need intranet services. Our problem is availability of WAN bandwidth and relegation to 10M bit/sec Ethernet on the LAN edges. I saw a presentation on Packeteer's PacketShaper, which provides quality-of-service enhancements by letting network analysts and designers filter TCP applications and guarantee or limit the amount of bandwidth an application can occupy. Is it an emerging technology or an expensive way to save money?

I've received favorable reports from colleagues testing and using PacketShaper. Reviews from *Network World* (see www.nwfusion.com/reviews/0406rev.html) and others also are positive.

As a network architect at Sprint Paranet in Houston, Blass understands the strain of developing and managing intranets. Send problems to dr.intranet@paranet. com.

Defining availability in packet networks

BY KEN REHBEHN

Most people take the telephone for granted. We assume the phone and the underlying network are always working for us, whether we're ordering pizza or calling for an ambulance. Packet networks do not have this remarkable reputation for constant availability.

But why is availability an issue in today's packet networks that deliver ATM, frame relay or IP services? After all, we have long accepted less-than-perfect levels of availability elsewhere in our nets. Ethernet is a good example of media considered adequate for most applications.

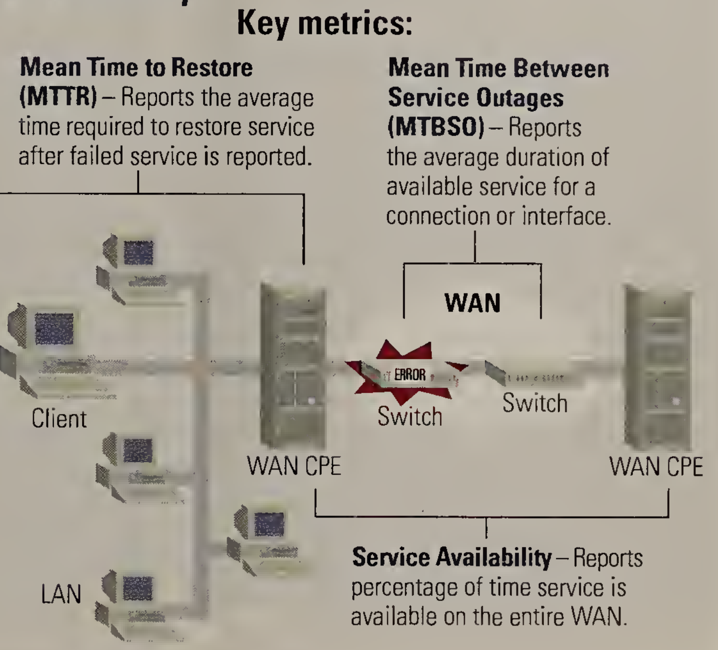
However, this elastic approach to network availability gets strained when mission-critical applications meet expensive public WAN services. The failure of a WAN in a network-centric organization can hurt business.

In packet networks, ATM, frame relay and IP organize and transmit data in collections of bytes, or packets. ATM fixed-length packets are called cells, and frame relay variable-length packets are called frames. Packets are forwarded into the WAN and queued for transport over links shared with packets from other users of the network service.

UP CLOSE

Determining WAN availability

Network hardware and software failures disrupt business operations. These outages must be tracked to build a record of failed service delivery. The resulting data is essential to gain compensation for failed service delivery and to help plan for service improvements. The record can also help you build more effective service-level agreements in the future.



Key metrics:

Mean Time to Restore (MTTR) – Reports the average time required to restore service after failed service is reported.

Mean Time Between Service Outages (MTBSO) – Reports the average duration of available service for a connection or interface.

Service Availability – Reports percentage of time service is available on the entire WAN.

Tracking availability

ATM, as a connection-oriented service, supports excellent tracking of interface and connection availability. Connection-oriented nets establish specific links between hosts or applications. Conversely, connectionless networks don't depend on specific links, but rather on message exchanges between hosts or programs.

ATM interface failures are physical or logical. Physical failures are indicated by loss of line signals. Logical failure is experienced when cell delineation is lost. This failure occurs when the interface is undergoing bit-error testing or the network facility is not properly configured. When the interface fails, all connections using the interface also fail.

ATM connections fail as a result of routing faults or trunk errors in the middle of the network, or customer premises equipment (CPE) failures at the edge of the network. ATM provides explicit notification of connection failure through Operations, Administration and Maintenance (OA&M) cells. Alarm Indication Signal (AIS) and Remote Defect Indicator (RDI) OA&M cells report faults on ATM virtual connections. Receipt of these cells at an endpoint indicates a fault along the path of the connection. Correlation of the fault indications is important to determine responsibility for the fault. If the endpoints both see AIS/RDI indications, then the fault is in the middle of the network.

Like ATM, frame relay is a connection-oriented service. Physical failures of the frame relay interface are indicated by a loss-of-line signal. Logical failures occur when the frame relay link integrity verification protocol, sometimes called the local management interface (LMI), fails to successfully perform a protocol handshake between the switch and the CPE. As with ATM, when the interface fails, all connections using the interface also fail.

Frame relay connections can also fail as the result of routing faults or trunk errors in the middle of the network. Frame relay provides notification of connection failures through status messages sent by the switch to the CPE. Each Data Link Connection Identifier (DLCI) supported by the interface is reported as active or inactive. A DLCI may be inactive because the remote CPE is turned off or the network has experienced a routing failure. As with ATM, correlation of fault indications is required to determine responsibility for the fault.

IP network availability is based on the physical status of the IP interface. Physical failures of the interface are indicated by a loss-of-line signal. No IP heartbeat is available to identify logical interface failures. Because IP is a connectionless service, no explicit connection status is available. These characteristics make it difficult to report IP availability.

The most widespread IP availability-measurement mechanism is the Internet Control Message Protocol, which offers diagnostics and error-checking features. Endpoint or router systems periodically send a ping to a location in the IP network. If the response returns in an acceptable period of time, the path to the location is considered available. By inference, the IP interfaces over which the ping traveled are also considered to be available.

Availability should be systematically monitored through service-level validation devices attached to WAN interfaces, such as intelligent DSU/CSUs. Availability must be measured as close as possible to the customer's end system. If availability is tracked in the network service provider's point of presence, failures in the last mile of the circuit will go undetected.

Rehbehn, product line manager of advanced planning for Visual Networks, a provider of service level management systems, can be reached at (800) 708-4784.

Gearhead — inside the network machine . Mark Gibbs

MAKING YOUR WEB PAGES ACTIVE

This week we look at a Microsoft technology that everyone has heard of but which remains largely misunderstood: Active Server Pages (ASP).

ASP began in 1997 as a project Microsoft called Denali. It was released as ASP in Version 2.0 of Microsoft's Internet Information Server (IIS).

ASP was designed to provide a mechanism for generating Web content dynamically at the server. The mechanism used is called scripting, which embeds program instructions as plain text in Web documents. Scripts can be written in a number of languages, including JavaScript, VBScript, Perl and Python, and are added to an HTML page inside special tags.

In operation, the ASP system is simple: When a document with an ASP extension is requested, the IIS Web server knows from the file name that the ASP handler should be used and passes the document to the ASP engine.

The ASP engine examines the document and calls the appropriate script language module, which in turn carries out the script instructions and creates an output document that is sent to the browser. Scripts can also communicate with external applications either on the same machine or elsewhere on the network, so remote services and databases can be used as part of the dynamic content.

Now you might be wondering why a scripted application system would be taken seriously; after all, scripting languages are always slower than compiled code. The answer is that applications built using ASP technology are simple compared to applications written to Microsoft's Internet Server API (ISAPI) or the standard Common Gateway Interface (CGI). The scripting is part of the HTML content, so ASP development and modification simply require editing Web pages.

The performance of ASP is, of course, not as good as well-engineered ISAPI applications, but Microsoft has done a good job of optimizing the ASP services for multiple users and threads. On the other hand, given the overhead of CGI applications, ASP performance is comparable. Combine the reasonable performance of ASP technology with the low engineering overhead, and ASP is a very appealing Web-application development strategy.

By way of an example, see www.gibbs.com/gearhead/gh04.htm for the simplest ASP document I could create — it shows that generating dynamic content can be accomplished easily. More sophisticated ASPs can access databases, manipulate cookies, track user sessions, send and receive e-mail, and check browser type so browser-specific content can be returned.

ASP originally emerged as a proprietary Microsoft technology, but it has started to appear on other platforms. For example, ChilliSoft (www.chillisoft.com) has released ChilliASP for AIX and Solaris, which supports Apache, Lotus and Netscape Web servers on IBM AIX and Sun Solaris. ChilliASP for NT supports Apache and O'Reilly Web Servers running on Windows NT.

ASP is a powerful system, and the fact that it has evolved out of Microsoft's direct control and has become a cross-platform tool makes it a technology you should consider for your Web site.

Recommended reading: *ASP: Active Server Pages,* by Andrew M. Fedorchek and David K. Rensin; *Active Server Pages For Dummies,* by Bill Hatfield; *ASP in a Nutshell, A Desktop Quick Reference,* by A. Keyton Weissinger.

In an unrelated note, "Gearhead" reader Allister Wei wrote responding to last week's column on Simple Mail Transfer Protocol relaying. He pointed out a valuable resource that looks at a related set of problems: How spammers use dial-up accounts and bypass their ISPs' mail servers to send spam, and how to prevent such abuses. The site is the Mail Abuse Prevention System's Dial-up User List at http://maps.vix.com/dul/.

Gearhead wants to know what topics you've found valuable and what you want us to cover — serve it up to gearhead@gibbs.com.

Network World Fusion Spotlight

News, tips and tools from our Web site

A suitable punishment?

Fusion users aren't in a forgiving mood these days. We're currently running a couple of insta-votes: one on the fate of the Melissa virus author; and the second on what should be done about pro-Serbian hackers. The extreme position is leading in both cases.

Some 41% of respondents said Melissa's author should be jailed for as long as the law allows, compared to 16% who said he should just be fined and 36% who said he should be thanked for raising our security conciousness.

Meanwhile, in our Balkan cyberwar forum, 54% thought an appropriate response to pro-Serbian hacking of NATO and U.S. sites is "to e-bomb them back to the cyber-Stone Age." Some 36% thought we should respond with purely defensive measures (securing our servers and sites), while 6% said we should engage in a little tit for tat (for example, if they hack one of our sites, we hack one of theirs).

We realize these votes are 100% unscientific. But that's why we also have forums — to discuss issues in more depth. For example, a number of people have criticized NATO for letting the hackers get away with such widely known hacks as e-mail bombing and ping of death attacks.

DocFinder: 2329 (Melissa forum)

DocFinder: 2448 (Serbian hacker forum)

Help Desk

Ron Nutter continues his look at Internet-access issues. This week, a reader with a brand-new T-1 line wants to know if it would make more sense to run his own Domain Name System (DNS) servers or let the ISP handle them. When the reader's company switched ISPs, it lost e-mail for several days while the new ISP reconfigured the DNS settings.

DocFinder: 2451

Tool of the week

While a lonely Windows NT engineer may consider logon scripting a fun hobby, many dread the task of managing multiple scripts for groups of users. Inteletek's NTscript 2.0 helps bring order to the chaos that is logon script management.

NTscript uses a graphical interface to help administrators configure, edit and manage logon scripts for large groups of users. Administrators can alter drive mappings, Outlook profiles, Internet access and a variety of other settings from the NTscript management console. Software updates can also be centrally managed using the tool. Administrators can even set periodic purges of pesky temporary files from user hard drives.

NTscript works with Windows NT Workstation, 95 and 98, as well as Citrix WinFrame. A free limited-time trial version is available. Check out NTscript and other fine tools in our Fusion Download area.

DocFinder: 2452

Dr. Intranet archive

We've put together a collection of Dr. Intranet's advice and tips for building and running your intranet.

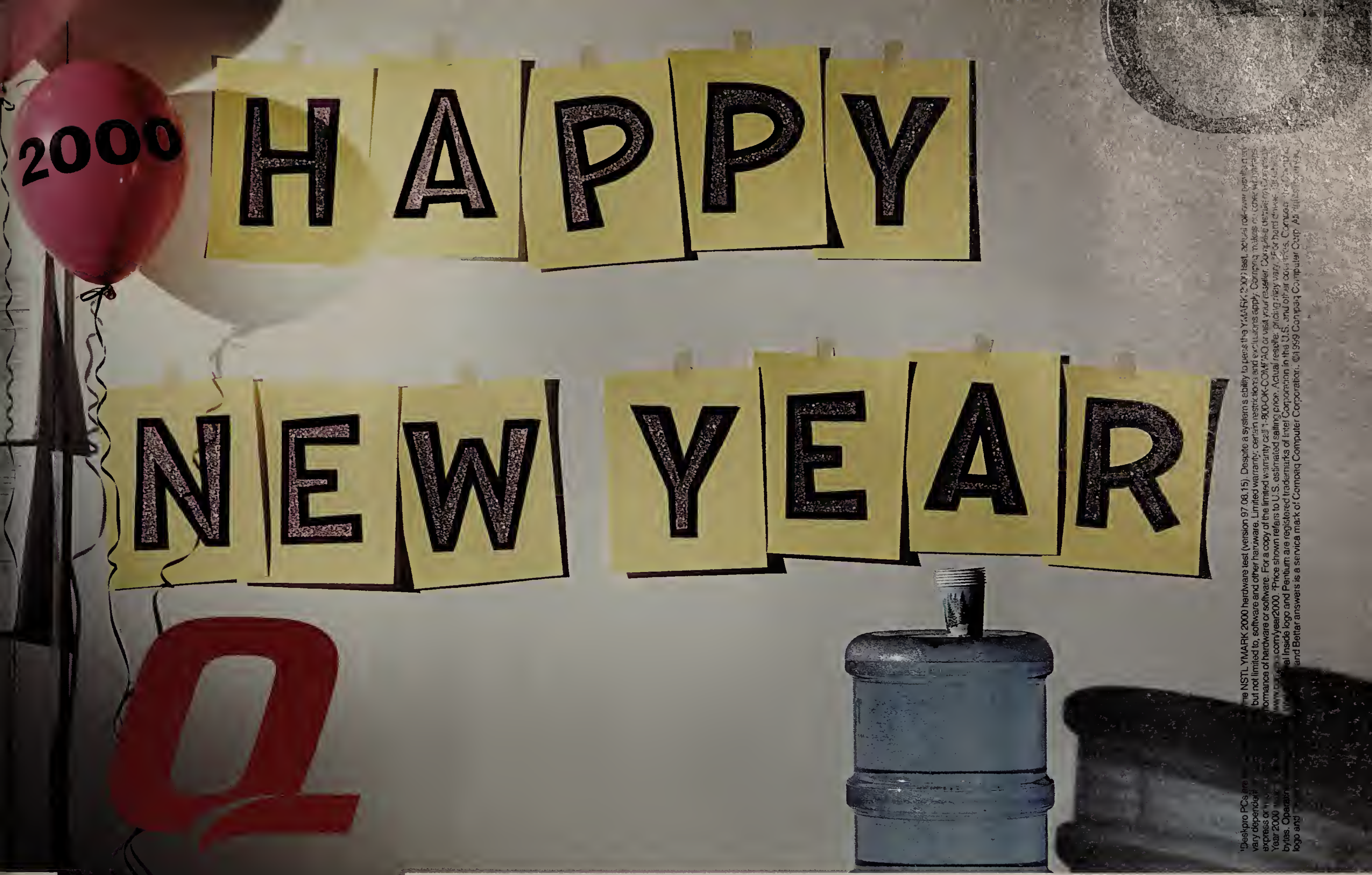
DocFinder: 2453

Web application newsletter

Speaking of intranets, our very own Mark Gibbs, one heckuva versatile guy, writes our twice-weekly e-mail newsletter on Web applications. It's free and will keep you up to date on new applications and other useful things. Check out the newsletter archive, then sign up.

DocFinder: 2457

www.nwfusion.com



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Opinions

Editorial Insights

Policy-based management ain't what it used to be

Over the past year, policy-based management has degenerated from a laudable concept to an almost completely meaningless buzz phrase.

The idea started out ambitiously enough. You tell the policy-based management software your business policies, and the software tells your enterprise's network hardware how to support them. Tied to a network directory, the software could match individual people in the organization with their network addresses. Based on importance to the business, a user or application would get a certain priority, a certain level of quality of service (QoS) and bandwidth, and certain access rights.

This was a new, bold concept — so new and so bold that a standards effort was launched to define how the software should communicate policies to network hardware.

Lately I have been receiving lots of press releases from vendors saying they support policy-based management. But they're not talking about the set of capabilities I outlined above. It's usually a small subset of those capabilities.

So if a switch can divide traffic into a couple of separate queues, the switch vendor will probably call that ability policy-based management. If a firewall lets some people through and denies access to others, it's enforcing policies, right? That's the way many vendors are starting to think, anyway.

In the scramble to add policy-based management as a check-off item in their product literature, vendors are diluting the term's meaning. Vendors are always co-opting the latest jargon because they want to be perceived as hip and fully buzzword-compliant. But here's the irony: Even if you could do full-blown policy management, it might not be desirable.

Though it's a good concept in theory, policy-based management might take more effort than it's worth to put into practice. Consider the Herculean task of getting all the different brands of equipment in your network to work together to support uniform QoS. Or the political headache of figuring out which departments in your organization deserve priority.

In many cases, policy-based management is a can of worms that need not be opened. It was driven in the beginning by financial services companies that want to make sure the customers with fat wallets go to the head of the line during a stock-market panic that causes network congestion.

Some organizations need this kind of policy enforcement, but many others don't. Figure out your organization's needs and focus on them. It's the only way to cut through the noise.

— Jeff Caruso
Senior editor
jcaruso@nww.com

Message Queue

PRIVATE PROPERTY

We at Lucent were very disappointed with *Network World's* unbalanced portrayal of our efforts to protect our intellectual property ("Lucent hardball," March 22, page 1). We used to give away valuable Bell Labs technology in the monopoly Bell System days. But now we're a fast-moving company in a highly competitive industry, and we thrive on the creation, protection and commercialization of intellectual property. That's the world today.

The fact is every company that makes a significant investment in research and development takes steps to protect its technology and gain legitimate access to other's technology through licensing agreements. Lucent's program is by no means "epic" or "aggressive" by comparison.

The licensing of technology facilitates the sharing of ideas, expands the marketplace and stimulates further innovation.

Many companies are in business today — and whole industries have been born — because they have licensed Bell Labs' technology. We are pleased to license our technology and have every right to expect fair value for it.

Richard Rawson
Senior vice president and general counsel
Lucent
Murray Hill, N.J.

MISCONSTRUED REVIEW

Your review of Computer Associates' NetworkIT Pro ("Too much too soon," March 15, page 53) contained strong misconceptions that became the basis for inaccurate overall conclusions about the product's appeal to network managers. The piece also contained factual and technical errors that contributed to those false conclusions.

The review incorrectly characterized NetworkIT Pro to be a scaled-down version of CA's industry-leading enterprise management product, Unicenter TNG.

In reality, CA's IT family of products, including NetworkIT Pro, was created to address specific disciplines within enterprise management. NetworkIT Pro, for instance, was designed to provide total network management, equivalent to the network management portion of Unicenter TNG.

Just as Unicenter TNG provides total enterprise management for multiple system and network management disciplines through robust core functionality and options, NetworkIT Pro was designed to provide total network management through a combination of a robust base product and numerous options.

It has built-in capabilities that are not found within competing vendors' network management products.

Consequently, your review's mischaracterization of NetworkIT Pro as a scaled-down network management product resulted in a negative classification of the product's full functionality.

In addition, the reviewer evaluated several options that are included on the NetworkIT Pro CD as if they were included within the core product. The additional functionality is provided in the form of options for clients who need to manage Ethernet switches, frame relay, network traffic flow (using SuperPing Path Doctor), SNA, DECnet, operating systems and so forth.

As separately sold options to the base NetworkIT Pro product, these options allow network managers to customize a solution that can best address their management needs.

We at CA understand that clients do not require all network management tools in one large package. For this reason, we designed another product, called simply NetworkIT, to provide the scaled-down functionality intended for organizations with up to 250 nodes — functionality we consider so basic and essential that CA currently licenses this product without a fee.

The incorrect impressions presented in your review combined to make NetworkIT Pro seem "too robust," which, in light of its true network management use, could not be further from the truth.

Imran Anwar
Product manager
Computer Associates
Islandia, N.Y.

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

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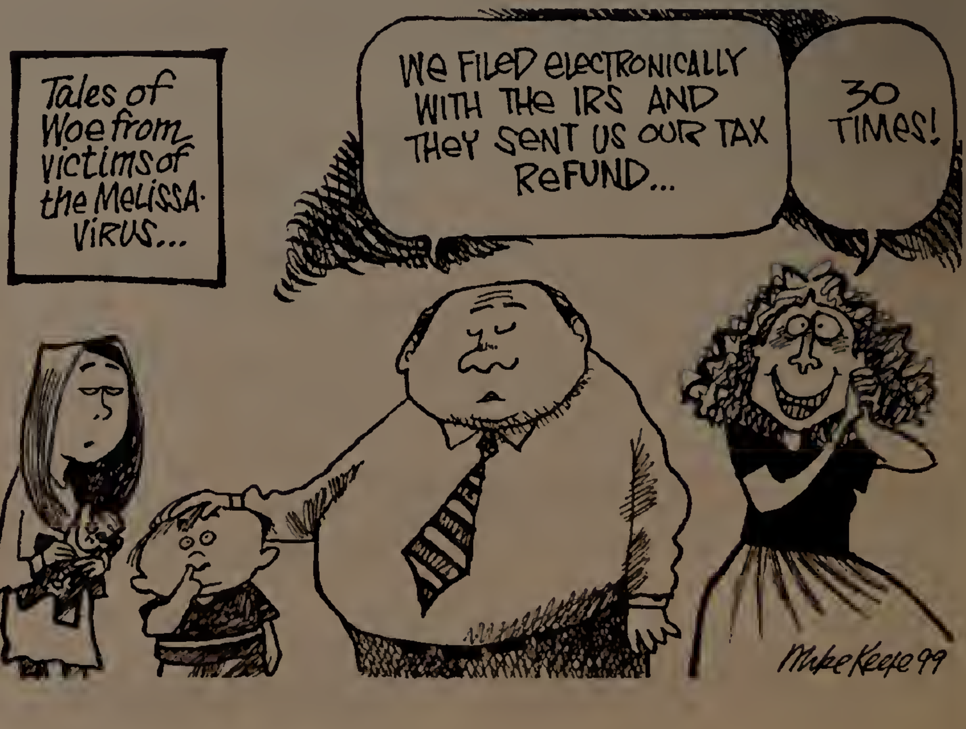
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Bottom Line . Joel Snyder

MAKE SURE YOU'RE NOT BEING SCAMMED BY YOUR CLEC

Does a competitive local exchange carrier (CLEC) provide your phone service? If so, check your bill because you may be paying unnecessary surcharges.

When the tight intertwining of the local and long-distance companies was unwound by federal fiat, the Federal Communications Commission established a complex series of tariffs and fees to help keep things in balance. The problem with these charges is that they are all shrouded in the incoherent language of telecommunications law. This confusion has led some CLECs to take advantage of customers by tacking questionable charges onto monthly bills.

For example, the FCC allows regulated local exchange carriers (LEC) to add a subscriber line charge to each telephone line. The purpose of this charge is to allow LECs to spread charges fairly between local and long-distance services. To the consumer, it all hits the bottom line, but in the world of telecom regulation, this is an important distinction. State public utility commissions can only set rates for local services, so the FCC has to step in to ensure that the LECs get revenue to compensate them for costs related to interstate calls. But this is only relevant in the regulated environment of the incumbent LEC.

CLECs, however, are not regulated, so they don't have a public utility commission to worry about. Thus, the whole concept of CLECs imposing subscriber line charges makes no sense. Yet you may be hit with charges of $9 per line, per month more than your contract states. Your CLEC may tell you these charges are "taxes" or "FCC mandated," but they're not.

Paying the amount for which you contracted would seem to be an easy thing, but your CLEC has no intention of making it pain-free. Follow these steps and you may get closer to the truth.

- Get an itemized bill. This may take some doing. If you run into trouble getting one, try asking for a copy of your customer service record, which may help clear things up.
- Verify that you're receiving the services for which you're being charged. This could take a lot of work because phone lines have a tendency to proliferate. Nevertheless, remember that every unused or overcharged phone line you find can save your company more than $500 per year — a sum that's worth looking for.
- Compare the charges on the bill with the contract. Needless to say, they should match. If there is a discrepancy, insist that the CLEC investigate.
- Have all of the taxes and fees explained to you. Although federal, state and city taxes are inevitable, the rates may be incorrect. Compare them with your home phone bill to see if things seem to match. Anything else added to the bottom line needs justification; if the CLEC can't justify it and it's not in the contract, don't pay it.

Snyder, a Network World Test Alliance partner, is a senior partner at Opus One in Tucson, Ariz., where he hopes one day to be able to fully explain at least one month's phone bill. He can be reached at jms@opus1.com.

Above the Cloud . James Kobielus

EVENTS CALENDARS: AN APPETIZING ALTERNATIVE TO SPAM

Electronic commerce depends on effective advertising, but online advertising is a tricky business. How do companies get their commercial messages out to the masses without alienating their potential customer base?

Today's online advertising options are not ideal. If you want potential customers to ignore you, display innocuous banner ads on scattered Web pages. If you want them to hate you, push spam in their faces.

A new, more attractive option is the use of Web-based events calendars. Unlike spam, which sprawls across your inbox, events-calendar entries plop themselves into predefined subject categories, according to rules enforced by calendar managers. You define the content categories in which you're interested and configure your online calendar accordingly. You can then browse your personalized calendar by category or subject and retrieve only the commercial messages that tickle your fancy.

Do you want to know which technology seminars are being offered in your area tomorrow? Or which business productivity software packages are now in stock at your favorite online software vendor? Or which initial public offerings you can participate in through your online broker this week? Or when your local carrier will roll out DSL service in your area? Check your personalized events calendar, provided to you (potentially) through many e-commerce sites, online communities and portals.

During this year, we'll discover which start-up events calendar brand names — When.com, Jump.com, AnyDay.com and others — will survive and dominate in this emerging market. They will compete on such features as placement on leading portals, access to broader events listings, and synchronization with users' desktop and portable calendars.

However, for online events calendars to fulfill their promise, they must be adopted and implemented effectively by leading portals, e-commerce sites, online communities, freemail services and online publishers. So far, I don't see the Internet industry making a mad dash in this direction.

What's holding the 'Net back from adopting events-calendaring services in a big way? The primary sticking point is the popular misconception that Web-based calendars are just browser-accessible clones of your familiar workgroup and desktop calendaring applications.

Unfortunately, Web calendaring vendors are fostering this misconception by retaining business-oriented feature sets and user interfaces. They are stressing such features as the ability to synchronize with calendars maintained on personal information managers (PIM) and personal digital assistants — in other words, with applications and terminals of relevance primarily to the business market.

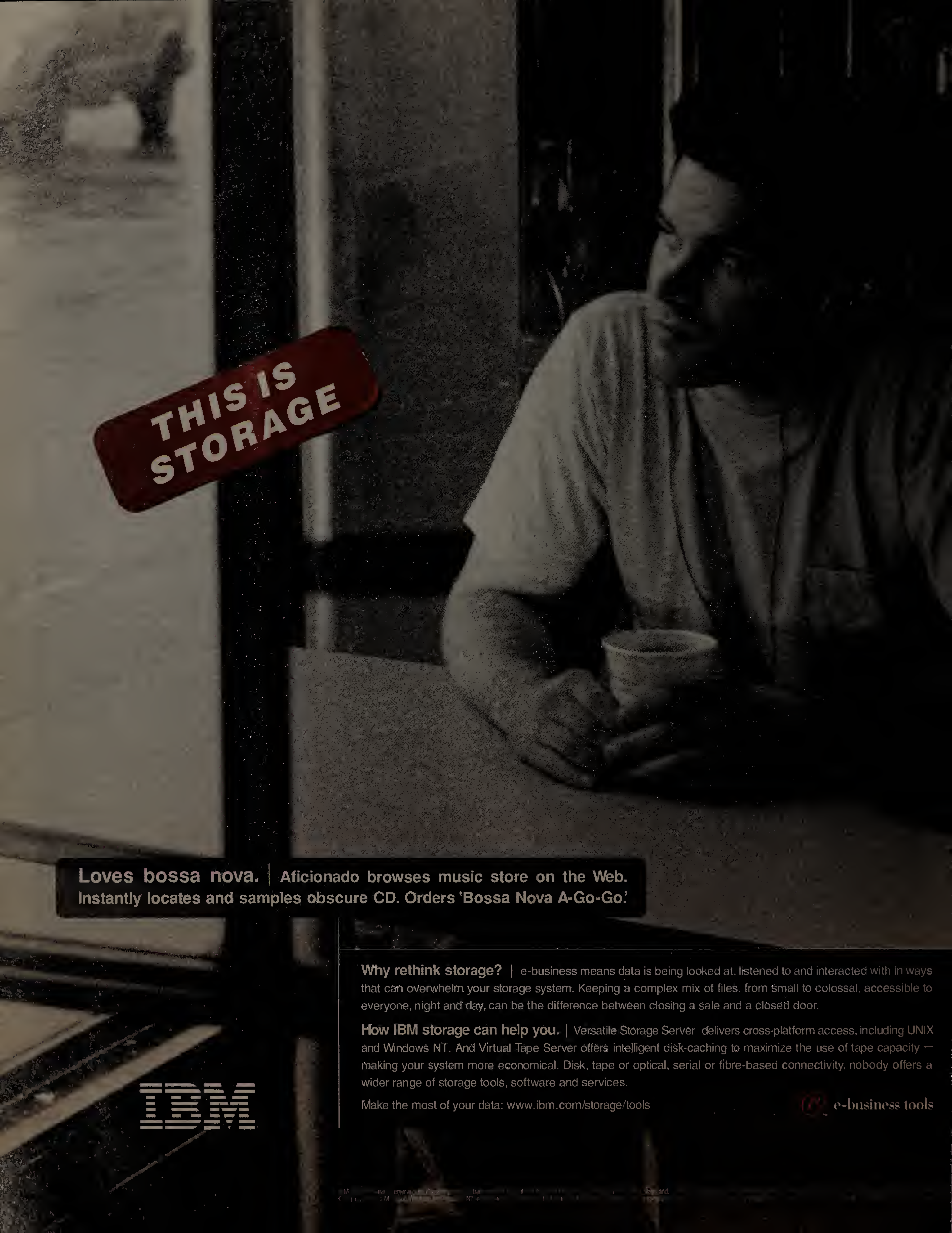
This is entirely the wrong approach. Business users already have better workgroup and personal calendaring tools on their desktops. Web-based calendaring products fall far short of Lotus Notes, Microsoft Outlook and most of the other shrink-wrapped calendaring-enabled clients on the market these days.

For events calendaring to take off as an advertising medium, calendaring vendors must reposition their services into the e-commerce market. They must secure high-visibility portal placements, content partnerships and e-commerce tie-ins. They must build back-end services that can scale up to support massive, dynamic databases of events and time-sensitive commercial messages.

And they must re-architect their user interfaces to support more intuitive browsing of a high volume of listings, including live events, product announcements, promotions and solicitations. Current Web-calendaring services still adhere to PIM-style interfaces, which quickly turn awkward and ugly when you start jamming dozens of overlapping events into a single day or week.

What's the best user-interface design for online events calendars? Search me. I leave that issue for the creative minds, and there are many of them, in this exciting new niche market.

Kobielus, a contributing editor to Network World, *is an Alexandria, Va.-based analyst with The Burton Group, an IT advisory service that provides in-depth technology analysis for network planners. He can be reached at (703) 924-6224 or jkobielus@tbg.com. The opinions expressed are his own.*



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WEATHERING A MARKET STORM

Online brokerages shore up their systems to cope with the e-trading flood.

BY LAUREN GIBBONS PAUL

Fred Matteson, executive vice president of technical services at Charles Schwab & Co., sounds weary when discussing the recent highly publicized failures of his company's online trading site.

"I've had better months in my 21-year technology career," Matteson says, alluding to two lengthy February outages experienced by Schwab, the top online retail brokerage. Hot on the heels of these incidents came another crash in early March.

"The good news is we had no network-related outages — and have had none in recent memory," Matteson says, knocking on wood as he speaks.

Matteson and his counterparts at other online brokerages have learned to be humble. In the volatile online trading world, customer demand for speed and availability is taxing online trading networks. In the corridors of Schwab's San Francisco headquarters, this phenomenon is called Market Storm. Reminiscent of the Gulf War's Operation Desert Storm, the name reflects Schwab's view that the struggle to maintain adequate capacity is nothing short of war.

"The biggest leaps forward happen after outages, when we find a weakness we didn't know we had."

Fred Matteson, executive vice president of technical services, Charles Schwab & Co.

Online brokerages are racing to shore up their systems to enable them to flow with the tide of trading volume. All brokerages are going over their networks with a fine-toothed comb to ensure there is ample capacity and no single point of failure. Some brokerages, such as Fidelity, are using sophisticated Web management tools to closely track application performance and warn of looming availability crises well in advance.

Growing pains

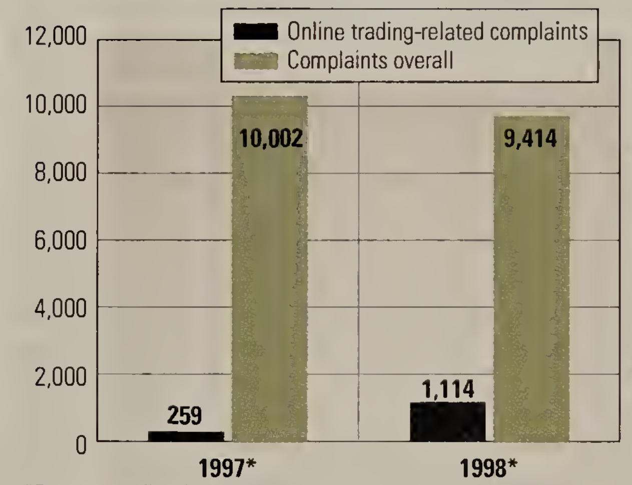
Without question, 1998 was the year of the online brokerage. The total number of online retail trading accounts nearly doubled from 3.7 million in 1997 to 7.3 million in 1998, according to U.S. Bancorp Piper Jaffray, a Minneapolis-based securities market research company. The number of accounts is forecast to grow to more than 12 million by the end of 2000, and brokerages stand to make $3 billion this year from online trades.

Along with the explosive increase in online trading has come a host of capacity-related problems. Schwab, E*Trade Group and Ameritrade each suffered significant outages in February. Nearly all of the major online brokerages have sustained service interruptions in the past two years, although not all were due to network problems. Schwab's recent outages, for example, were caused by glitches ranging from a limitation in a storage-management software program to human error in a DB/2 configuration (see Figure 1).

Naturally, consumer complaints to the Securities and Exchange Commission (SEC) have burgeoned along with the outages (see Figure 2). Delay or failure to execute a trade is the top consumer complaint, according to John Nestor, a spokesman for the SEC in Washington, D.C. Other common gripes include errors in processing and an inability to access the online system and the telephone support system.

Figure 2: Complaints are on the rise

The number of complaints consumers filed to the SEC regarding online trading experiences increased a whopping 330% from 1997 to 1998.



*Represents fiscal year

SOURCE: SEC, WASHINGTON, D.C.

Tales of online trades gone awry abound. *Business Week* recently recounted the misadventures of a Massachusetts man who reportedly lost $25,000 as the result of an error in his online Schwab account. E*Trade's stock price tumbled last month after a group of angry customers announced it was suing the No. 3 online brokerage over delays and errors in their trades. With nearly 100,000 online trades per day, Schwab is clearly at the center of the Market Storm. Its closest competitor, Waterhouse Securities, executes an average of only 42,000 trades per day, according to Piper Jaffray (see Figure 3).

Online customers connect to schwab.com via one of hundreds of Netscape Enterprise Servers, which

Figure 1: Singing the outage blues

Several online brokerages have experienced service outages since the beginning of the year. Here's a rundown of the most-publicized outages and their causes:

Brokerage	Date of outage	Duration	Cause
Charles Schwab	March 1	25 minutes	Unforseen limitation in storage-management software
	February 24	90 minutes	Memory space available in the main console region of the primary mainframe was exhausted
	February 17	15 minutes	Configuration error in DB/2
	January 8	35 minutes	Configuration error resulting from moving Web traffic over to a second, new mainframe
E*Trade Group	February 5	60 minutes	Problems with new server installation
	February 4	60 minutes	Problems with new server installation
	February 3	120 minutes	Problems with new server installation

Figure 3: **Average daily online trades: June - Dec. 1998**

	Q3 '98			Q4 '98		
	Trades per day	Share	Rank	Trades per day	Share	Rank
Schwab	76,608	30.1%	1	93,000	27.6%	1
Waterhouse	26,500	10.4%	4	42,003	12.5%	2
E*Trade	27,450	10.8%	3	39,990	11.9%	3
Datek	21,272	8.4%	5	33,695	10.0%	4
Fidelity	28,428	11.2%	2	33,100	9.8%	5
Ameritrade	18,246	7.2%	6	25,725	7.6%	6
DLJ Direct	10,448	4.1%	7	13,366	4.0%	7
Discover	9,400	3.7%	8	11,531	3.4%	8
SURETRADE	6,900	2.7%	9	9,600	2.9%	9
NDB	3,910	1.5%	10	4,420	1.3%	10
Others	25,462	10.0%		30,306	9.0%	
Total	254,624			336,736		

validate users' identities in the demilitarized zone just outside Schwab's firewall. Once a user is authenticated, he is given a session key and is allowed into the secure area. If a user wishes to make a trade, he is assigned to a trading server, one of hundreds of IBM SP/2 boxes running AIX. The trading server manages access to data and initiates transactions with the mainframes that handle mission-critical tasks, such as updating accounts and sending messages showing users' positions.

For example, if a user wanted to buy 100 shares of Microsoft stock at market price, the trading server would route the request to a third-party market-making firm, such as Mayer & Schwitzer, which executes the trade. (Schwab uses several of these firms.) The trade is reported into the NASDAQ system, where Microsoft is traded. NASDAQ routes a notice of execution back to the Schwab mainframe, which in turn sends the notice to the user.

A trade officially takes three days to process — a rare glitch could prevent the third party from executing the trade for a variety of reasons — but shipping the notice of execution back to the user usually takes only a few seconds. In most cases, the user can see his updated position in a matter of minutes.

Problems tend to occur around market opening, at 9:30 a.m. Eastern Standard Time, which is when traders begin their daily trading flurry. This new breed of online investor pushes Schwab and other online brokerages' systems to the wall. "Day traders believe their fortune is tied to being able to be in and out of securities in the same day," Matteson says.

Day traders demand quick execution and notice of execution so they can check their accounts on an almost real-time basis. Schwab's Big Iron processes upwards of 150,000 trades per day — 93,000 of which are online trades — and more than 3.5 million CICS transactions per hour. A full 100,000 users can sign onto the system simultaneously. If all goes as planned, that number will soon increase to 200,000 when Schwab adds an eighth mainframe at the primary data center.

As for traffic volume, Schwab's recent high-water mark was 50 million encrypted hits on Jan. 8, although new high-water marks come fast and furious these days.

"Our goal is to provide unencumbered access to the system at market open," Matteson says, adding that he hopes to reach that state by mid-year.

Schwab's experiences provide a valuable lesson for others in the industry. "The biggest leaps forward happen after outages, when we find a weakness we didn't know we had," Matteson says. "We rarely have the same problem twice." Matteson sees the recent storage-related problems as one of the last stages in the evolution of systems difficulties.

But there is still the Internet to deal with.

"The Internet was designed to be an academic medium. It was not designed to handle this level of transactions," Matteson says.

Three years ago, when Schwab debuted its online service, most outages were caused by ISP problems. In 1996, for example, a rat stumbled onto a transformer, got electrocuted, and caused a huge short that brought down an Internet site owned by BBN Planet. "So the first problem we went after was resiliency," Matteson says. Toward that end, Schwab established multiple access lines to five ISPs. With three T-3 lines, Schwab has a total of more than 1G bit/sec Internet access capacity.

"Even with the outages that we suffered, our availability is still 99.1%, and the call centers were open to take trades during the outages," Matteson says. "We now have a highly redundant network inside. There is no single point of failure once the consumer has reached our site. We understand those problems very well.

"The sheer size of Schwab's online operations also brings a number of challenges. "More than one vendor has gotten that deer-in-the-headlights look when they see how much we're processing. We learn together," Matteson says.

Life has been pretty good for Fidelity, the No. 2 online brokerage in terms of number of accounts and No. 5 in trade volume, according to Piper Jaffray. The firm has experienced no outages this year, says Joe Bai, vice president of Internet engineering for Fidelity Personal Investing and Brokerage Group, a subsidiary of FMR Corp. in Boston. "I'm sitting here with a big smile," he says, albeit with his fingers crossed.

Fidelity says it is now processing 45,000 trades per day, up from Piper Jaffray's figure of 33,100 for the fourth quarter of 1998. Even the higher figure is fewer than half of Schwab's 93,000 trades per day, so Fidelity's trading systems don't quite face the same stress level as Schwab's. Still, Bai sees part of his job as keeping his company's name out of any headlines trumpeting system crashes.

"We make availability one of our differentiators; performance and features come next," he says.

To safeguard against service interruptions, Fidelity duplicated its three-tier, Unix-based client/server system at three locations: Marlborough, Mass., Merrimac, N.H., and Dallas. WebSpective Software's WebSpective product provides load balancing across the three locations and allows Fidelity personnel at each site to manage content distribution as well as monitor system and application performance.

SHAWN HENRY

"We make availability one of our differentiators; performance and features come next," says Joe Bai, vice president of Internet engineering for Fidelity Personal Investing and Brokerage Group.

WebSpective Java agents collect data from Fidelity's various servers and react if any component isn't up to snuff. For example, Fidelity sends out small content updates to its 100 Web servers every 10 minutes. If, for some reason, one of the servers can't accept the update, WebSpective makes sure the fresh content is no longer sent to that location and the server is taken offline. This move guards against the possibility of some users receiving stale information, says Megan McDonald, director of marketing/communications for WebSpective in Needham, Mass.

Fidelity also employs WebSpective's Interceptor load-balancing capability at its primary ISP to protect against carrier outages.

"We worry most about backhoe incidents when the carrier disappears from our point of view. We have no control over this," Bai says. Should one ISP link go down, WebSpective can shift the load elsewhere.

"This is incredibly proactive load management," Bai says. "We need that because we have an enormous amount of load devoted to the Web channel.

Continued on page 44

No word (yet) from E*Trade

The folks at E*Trade must be keeping their noses to the grindstone in the wake of server installation problems that caused a series of outages. Our attempts to talk to the network professionals who could fill us in on what happened were to no avail. Over the course of more than three weeks, E*Trade public relations personnel were never able to set us up with anyone who could talk tech, and calls to the chief information officer went unreturned.

We found this interesting in light of stories published in recent weeks, in publications ranging from *The New York Times* to *Upside* magazine, in which E*Trade executives extolled the virtues of their client/server online trading systems. We wanted to find out how these systems work, and what went wrong, in the hopes that our readers could learn from E*Trade's misfortune.

We're not giving up yet. If anyone from E*Trade is willing to fill us in, we'll post the story online. Just drop me a line.

— Paul Desmond
Features editor
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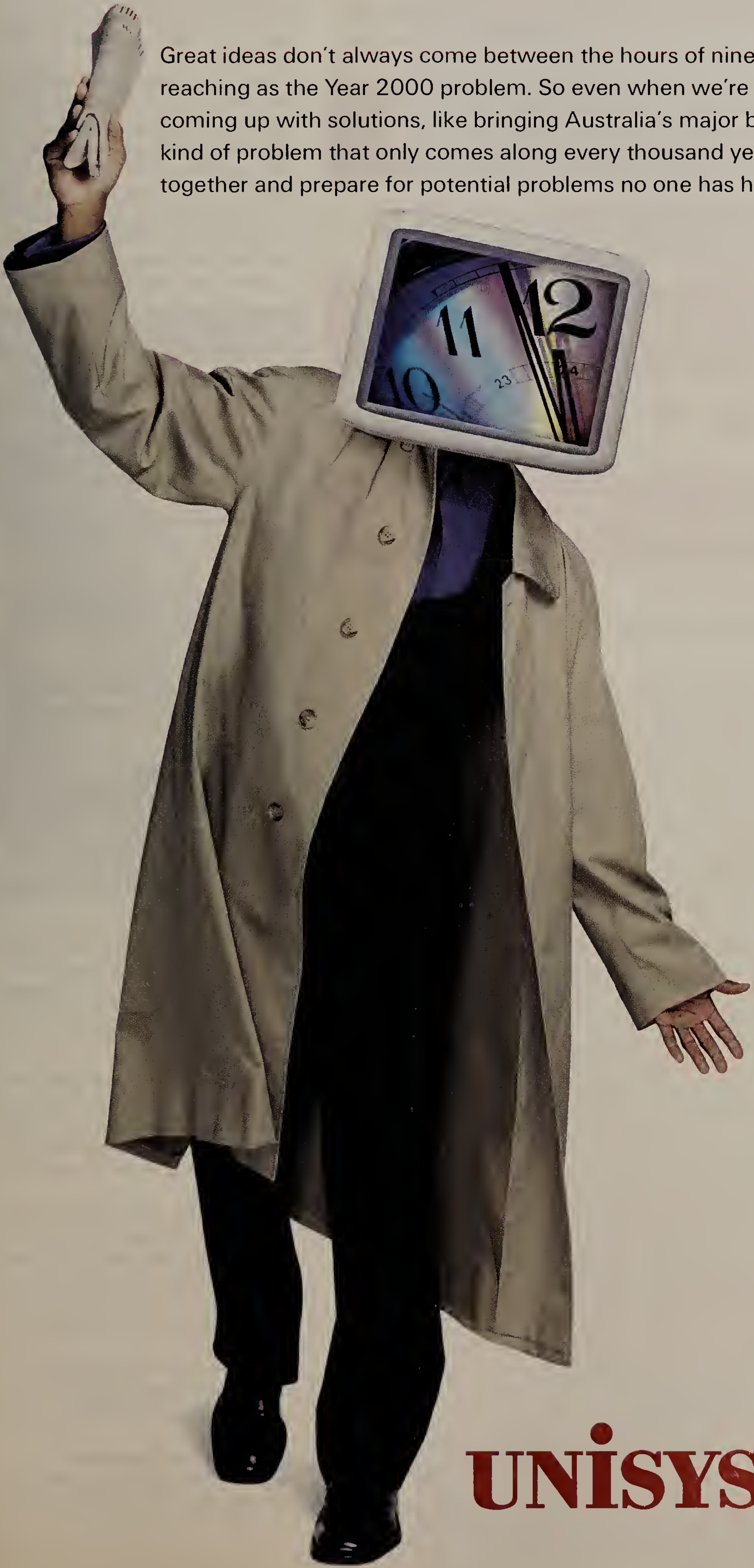

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Continued from page 42

That worries me. I don't want to get blamed for [problems resulting from] a busy day."

Discover Brokerage, No. 8 on the list of top 10 online brokers with 11,530 trades per day, views each component of the network as a possible point of failure. The company has two mirrored data centers — one in San Francisco and one in Sandee, Utah — running Sun Unix boxes and Cisco network equipment. Each site operates at less than 50% capacity.

Darrell Davis, vice president and director of technical operations for Discover in San Francisco, says although his company hasn't experienced any serious outages lately, reading about Schwab's and E*Trade's recent woes provided a wake-up call.

"[The outages] prompted me and my staff to go look at our failover systems. I wanted to reevaluate our exposures very carefully," Davis says. Like Bai at Fidelity, Davis worries particularly about ISP-related outages.

"Things can happen downstream in the trading process to affect us that are not our fault. Our ISPs may not have enough redundancy," Davis says.

Like many online brokerage firms, Discover routes its trades through various service bureaus, such as Automatic Data Processing (ADP). If ADP experiences an outage, a Discover broker calls and alerts ADP to hand off trades to another service bureau. Davis is evaluating ways to automate this process.

While Davis feels good about his company's recent track record, he knows he's not immune to problems. "I've been around long enough to know problems do occur. And Schwab and E*Trade have some very smart people working to solve those problems," he says.

One thing is clear: The shift from conventional trading to trading via the Internet has meant a sea change for network managers and other IT professionals in the brokerage business.

"Our notions of scale have been tested again and again," Schwab's Matteson says. "We must have transaction by transaction redundancy and reliability — and all this must happen automatically. These are big network challenges."

Matteson admits he'll sleep better once the company's new mainframe has been brought successfully online.

Paul is a freelance writer in Belmont, Mass. She can be reached at laurenpaul@sprintmail.com.

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DIGITAL DOUGH FAILS TO RISE

BY NEAL WEINBERG

Remember electronic cash, digital dollars or cybercurrency?

The conventional wisdom three years ago was that consumers would never use their credit card numbers on the Internet. So in order for electronic commerce to thrive, highly secure digital money schemes were needed.

Up stepped DigiCash with a cryptography product called e-Cash. CyberCash launched its CyberCoin electronic payment service based on Secure Electronic Transaction (SET), a standard Microsoft and Visa developed for high-powered encryption and authentication of three-way transactions between shoppers, merchants and banks. Both products required consumers to set up an account with a participating bank, download software to create a digital wallet and spend their cyberbucks at participating merchants.

Fast-forward to 1999. E-commerce is booming, and consumers are buying their books, PCs and airline tickets with plain old plastic. Electronic cash transactions haven't even shown up as a blip on the e-commerce radar screen. Looking ahead through 2002, 99% of online transactions will still be made with credit cards, according to Jupiter Communications.

DigiCash convinced only one bank in the U.S. to try e-Cash, and Mark Twain Bank in St. Louis closed the book on its trial in September amid tepid consumer response. Two months later, DigiCash ran out of real cash and filed for Chapter 11 bankruptcy. After failing to generate much interest, CyberCash quietly picked up its CyberCoins and went back to the drawing board to develop a new product. And another early player, First Virtual Holdings, moved into the messaging business last year and changed its name to Message Media, Inc.

To sum it up, electronic cash crashed.

If you're about to go live with an e-commerce site, don't worry about setting up an electronic money system for your customers. If direct credit card transactions, backed by Secure Sockets Layer (SSL) encryption, are good enough for popular sites such as Amazon.com and Travelocity, they should be good enough for your firm, too.

So what went wrong with electronic payments? The lesson here is that a simple solution will beat a complicated one every time.

Consumers flat out refused to have anything to do with downloading the software needed to create digital wallets on their PCs. Denis Yaro, executive vice president at CyberCash in Reston, Va., admits ruefully that the company learned that lesson the hard way. "Making people download software was a loser," he says. And tolerance for downloads only got lower as newer, less cybersavvy shoppers went online.

There's no need to support electronic currency on your Web site when customers are willing to pay using plain old plastic.

By contrast, the only requirement for SSL is to use an SSL-enabled browser such as Microsoft's Internet Explorer or Netscape's Navigator.

At the same time consumers were balking at electronic money, they were getting over their jitters about making credit card transactions online. "Consumer experience has whittled away at security fears," says Scott Smith, an analyst at Current Analysis in Sterling, Va. Customers made a few purchases, gained confidence and then started diving in. Forrester Research says that consumers spent about $7.8 billion online in 1998.

Funny money

Despite the high-profile failures of DigiCash and First Virtual Holdings to crack the electronic money market, second-generation vendors have launched a flurry of new services over the past few months to make it easier for consumers to make purchases over the Internet.

Vendor	Service	Description	Availability
CyberCash	InstaBuy	Registration system expedites credit card purchases at participating e-commerce sites.	www.instabuy.com
Cybergold/First USA Bank	Cybergold	Customers use credit cards or credits to buy digital content such as music, videos or software on the Cybergold site.	Cybergold.com
IdeaLab	eWallet	Registration system expedites credit card purchases at participating e-commerce sites.	www.ewallet.com
Transactor Networks/Citibank	CitiWallet	Registration system facilitates credit card purchases at participating e-commerce sites.	www.transactor.net/citiwallet/

Web travel site Travelocity earned $285 million in revenue in 1998, all of it through SSL credit card transactions, says Jim Marsicano, vice president and general manager of the Ft. Worth, Texas, company. He has seen a dramatic improvement in customer acceptance of simple credit card transactions.

Marsicano's advice to anyone setting up an e-commerce site is simple: "SSL is going to suit customers just fine." There's plenty of credit card fraud in the world, but he's not aware of a single instance of credit card fraud resulting from a hacker intercepting an encrypted SSL transmission.

SSL also does the job for Seattle's Amazon.com and its customers. Consumer behavior over the 1998 holiday season indicates that shoppers have "erased that last little bit of doubt" about online shopping, says company spokesman Bill Curry.

Looking ahead, David Stewart, vice president of Global Concepts, an e-commerce consultancy in Norcross, Ga., predicts that SET will never officially die because the credit card companies have too much invested in it. However, by the time SET transaction methods roll out in the U.S., it will be far too late for anyone to care.

"SET was too big a mousetrap for what you were trying to catch," Stewart says. "It was overengineered." In trials, SET transactions were slow, cumbersome and unreliable, he says.

SET may be on the ropes, but CyberCash's Yaro argues that electronic cash isn't dead, it's simply taking longer to get off the ground than its backers anticipated. His position is that consumers rejected first-generation SET-based methods but will accept second-generation, thin-wallet options that place a software cookie on a client's PC. CyberCash has even come back with a new product called InstaBuy, which uses SSL security.

In the new setup, information about the shopper, such as credit card account data, shipping address and records of prior transactions, sit on CyberCash's servers, rather than on a client PC. A shopper registers once at the CyberCash site and can make purchases at participating stores with a user ID and password.

But Global Concepts' Stewart is skeptical, noting that CyberCash needs to get all major e-commerce sites to participate for the service to be attractive to shoppers.

The jury is still out on these newly introduced services, but the bottom line is that for any electronic cash system to become popular, it has to be an improvement over the way customers are buying now. And, thus far, electronic cash hasn't been able to make that case.

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Review

THE ART OF AUTOMATION

Mustang's Internet Message Center tops two competitors for automated handling of incoming e-mail.

BY MARK GIBBS, NETWORK WORLD TEST ALLIANCE

If you are promoting a hot product on your Web site and you post an e-mail address such as info@mycompany.com, you'd better be prepared. If your sales pitch is successful, the flood of e-mail inquiries may be overwhelming. If you respond slowly, inconsistently or inaccurately, you may lose customers.

To do it right, you can turn to one of several e-mail automation applications. These products examine all e-mail sent to a general corporate address and can automatically route, respond with standard documents, track and pass messages to human agents for more specialized handling (Note: Throughout this story we use "agents" to mean people rather than processes).

Product: Internet Message Center

Vendor: Mustang Software

NetworkWorld Blue Ribbon

Mustang's Internet Message Center's features, reporting tool and automation facilities outweigh a troublesome installation and earn it our Blue Ribbon Award

We tested three leading e-mail automation products and found they all work well. While there are areas in each that need improvement, the products all help you handle corporate e-mail efficiently.

The three products provide roughly the same services, but each takes a different approach. Our Blue Ribbon winner is Mustang Software's Internet Message Center (IMC), a product with tremendous scope and power. It offers the best reporting facilities of the products we tested and has the most sophisticated message distribution subsystem. Its main drawback is a troublesome installation process.

Running a close second is GFI Fax & Voice's Emailrobot. This is a terrific product — easy to install, fast and well-designed. It offers excellent flexibility and performed flawlessly. Emailrobot's pricing also makes it a great value among these generally expensive products. It was only IMC's more sophisticated reporting and queue management that beat out Emailrobot.

In third place is Calypso Message Center from Micro Computer Systems. This product is written completely in Java, which may be the cause of the sluggishness of its user interface, and may explain why the e-mail retrieval system occasionally paused for no apparent reason. Calypso Message Center needs a lot of polishing to be ready for anything more than a small organization. That said, we like the underlying concept and organization, and we look forward to the next major version.

Net Results

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Pros
- ▲ Rich feature set
- ▲ All e-mail clients supported
- ▲ Low cost

Cons
- ▼ Complex

Calypso Message Center 1.26
Micro Computer Systems
(800) 886-4923, (972) 659-1514,
www.mcsdallas.com/mcs/calypso/cmc/index.htm
For Windows NT and NetWare, $1,495 for 5 users; $7,195 for 25 users. Starts at $2,995 for all other platforms.

Pros
- ▲ Multiple platform support
- ▲ Simple setup and configuration
- ▲ Simple client interface

Cons
- ▼ Server performance occasionally seemed slow
- ▼ Proprietary client software required
- ▼ Limited mail filtering features
- ▼ Limited reporting
- ▼ Proprietary back-end database used

ScoreCard

	Internet Message Center	Emailrobot	Calypso Message Center
Agent features 25%	8 x .25 = 2.00	7 x .25 = 1.75	6 x .25 = 1.50
Automation facilities 25%	9 x .25 = 2.25	9 x .25 = 2.25	4 x .25 = 1.00
Queue management 10%	9 x .10 = 0.90	5 x .10 = 0.50	5 x .10 = 0.50
Reporting 10%	9 x .10 = 0.90	7 x .10 = 0.70	4 x .10 = 0.40
Configuration 10%	7 x .10 = 0.70	8 x .10 = 0.80	5 x .10 = 0.50
Installation 10%	5 x .10 = 0.50	7 x .10 = 0.70	9 x .10 = 0.90
Documentation and online help 10%	5 x .25 = 0.50	8 x .10 = 0.80	3 x .10 = 0.30
Total score	7.75	7.50	5.10

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

Getting the message out

An important aspect of e-mail automation is how messages are distributed to queues and agents. Mustang's IMC is the most sophisticated in message distribution. For example, unlike the others, IMC can pull back messages if they sit too long in an agent's queue. Queues, referred to as pools, are also assigned priorities, which allow messages entering a high-priority pool to jump over lower priority messages for faster service. This is a particularly useful feature for maintaining service levels for specific clients. IMC can also dynamically assign priorities to pools by taking into account message age and pool priority.

For load balancing, Emailrobot distributes messages on a round-robin basis to the agents assigned to a departmental queue. Calypso Message Center doesn't offer explicit load balancing, but agents can ask for more than one message at a time from departmental queues.

Canned responses

All the products offer some form of canned response library that lets you send standard replies to common questions.

IMC's response library is server-based and accessed through the client. Selecting the library option from the menu provides a hierarchical list of responses that you can search by title or full text. You can copy part or all of a library entry to the clipboard to paste into a response. This was the most sophisticated library function among the products we tested.

Because Emailrobot works with any e-mail program and without a client component, its library function is a separate application. GFI supplies a utility for Windows that pops up when you press a hot key. This is a straightforward service, but unlike IMC, Emailrobot lacks search facilities. This means users need to have a good knowledge of what documents are available.

The Calypso Message Center library interface is built into the client, and library contents are stored at the server. Agents, when working on a reply, can switch from the client to the library, select part or all of a canned response and paste it back into the reply. This library service is comparable to Emailrobot's, but we found it slower and harder to use.

All the products produce reports that allow you to assess service levels. IMC offers a huge number of HTML reports that slice and dice system performance as finely as you please. The IMC manual details how to automate report production.

Emailrobot includes the ability to compare departments' and individual agents' performance and graph their productivity over time. Reports can be output as HTML content for online display.

The reporting in Calypso Message Center is adequate for basic system performance analysis, but there's a lot of room for improvement. For example, you can't break down the statistics on an agent-by-agent basis, a basic requirement for call center management.

ADDING WORKFLOW

GFI has a companion product for Emailrobot called Emailflow. Emailflow is a workflow product that integrates with Emailrobot and allows you to include workflow and custom procedures to the handling of inbound e-mail. Emailflow includes a graphical editor to define workflows without programming. We were impressed with this product and expect to see other vendors implement similar strategies.

Building blocks

While all the products work with Simple Mail Transfer Protocol (SMTP)/Post Office Protocol 3 (POP3) servers to send and receive e-mail (Emailrobot works with Microsoft Exchange, as well), that's where the similarities end: Each product uses a different architecture.

Mustang's IMC uses a central server that routes and filters all messages. An IMC Agent Client, which runs alongside any standard e-mail client at the agent's end, connects to the server via HTTP to queue and manipulate messages. IMC's Agent Client is available for Windows and Java.

The IMC server can employ a number of tools to process incoming messages, including autoresponders and filters, as well as techniques such as sophisticated processing using scripting languages through the Windows Scripting Host.

The version of IMC we tested, Enterprise Edition, uses Microsoft SQL Server as its database, while an entry-level system, Business Edition, uses the less-scalable Microsoft Access database.

More Online
Read an overview of four high-end e-mail automation products: eGain's Email Management System; Kana's Customer Messaging System; Genesys' Genesys Suite; and ErgoTech's E-Mailroom.
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GFI's Emailrobot runs only on Windows NT 4.0 and can work with Microsoft Exchange Server or SMTP/POP3 servers.

Emailrobot has a central server that retrieves messages from multiple POP3 accounts and provides message processing and routing services.

Emailrobot's agents work with any POP3 client. When Emailrobot determines that a specific agent is the correct recipient for a message, the message is routed to the agent via the SMTP/POP3 server.

Messages routed to agents are modified by adding a tracking code to the subject field and by changing the reply-to address to the address of the server. When the agent has evaluated the message, he can send it back to the server, which routes it back to the originator as a reply; send it to another agent for specialist handling; or ship it to another process, such as a Web conferencing system.

Emailrobot supports sophisticated processing and routing of messages. GFI designed an entire language, similar to Microsoft's Visual Basic for Applications, to drive the processing. To make things easier, GFI supplies a series of wizards to describe a processing task.

The output of the wizards is a program that can be used as is, or modified to integrate with other applications. Output programs can perform database lookups or any other message operation.

Emailrobot can use any Open Database Connectivity database as its message store and to archive messages. The software can also handle the output from Web forms mailed to Emailrobot. This lets you generate e-mail responses to Web-derived content, such as inquiry and order forms, and store and manage the data as needed.

The simplest architecture is that of Micro Computer's Calypso Message Center. This product is potentially the most versatile — it is written entirely in Java and can, at least in theory, be run on any platform that has a Java Runtime Environment. Micro Computer Systems provides installation details for Calypso Message Center on NT, Solaris and NetWare; and details for the client, referred to as a workstation, on NT and Solaris.

Calypso Message Center consists of a central server that polls one or more accounts on a POP3 server. Incoming messages from a particular POP3 account are assigned to a department (a pool of messages) associated with that account — a simple approach to routing.

Calypso Message Center also offers more complex routing that allows for mail from a monitored POP3 account to be subjected to filters. The filters route messages from any POP3 account to any department according to rules you define. For example, although a message is received on the sales POP3 account, because it contains the words "download patch," a filter can reroute the message to the support department.

Agents working on a TCP/IP-enabled PC use the workstation software to connect to the server and handle messages.

Another architectural element worth noting is the Calypso Plug-in Protocol, which allows programmers to extend the message processing facilities of Calypso Message Center with external applications on any platform located anywhere on a TCP/IP network.

For example, you could tie in an external application to search the message header for the "from" address, perform a lookup in a database to find the sender's account status, and send the message to an agent with the account status appended.

Calypso Message Center comes with its own proprietary database. The server can be set up to create complete automatic backups of all messages, statistics and configuration data. Because the database is proprietary, we have a concern that if something should go wrong — for example, a corruption in a critical backup — you could find that a quick recovery is difficult.

The most difficult installation was that of IMC, which uses Microsoft SQL Server 6.5. If there is a failure of any kind in the SQL Server setup process, IMC remains blissfully unaware of the fact and concludes installation with a cheery message as if everything were all right. Once you get beyond installation, IMC is easy to configure and get running, though the documentation is not overly helpful. The manuals have a cobbled-together look, as if multiple authors had documented multiple versions and then a subsequent editor merged the lot.

Installation of Emailrobot was easy. The documentation, while incomplete in some places, is well written compared with the average manual, and it is the most accessible documentation of the products we tested.

Calypso Message Center's server and workstation have long initialization periods after they load (at least 5 minutes and 30 seconds, respectively) for no obvious reason. As neither gave any feedback during this period, we kept thinking something had gone wrong. We also noticed that when agents retrieved messages, the agent software often slowed down. This worsened as we loaded the system.

Micro Computer Systems is also vague about some aspects of Calypso Message Center. The documentation is disorganized and clumsy. We thought that the advice in the manual, "If you feel that the amount of memory used during loading is excessive, you may want to change the initial Java heap size," to be far too general and essentially useless.

How we did it

Our test hardware platform was a Chatcom server populated with 200 MHz Pentium II boards with 128M bytes of RAM. On the server we ran Windows NT Server 4.0 Service Pack 3 and Microsoft SQL Server 6.5 Service Pack 5. Our mail server was the FTGate Mail Gateway from Floosietek.

We configured rules for each product to route certain messages to either or both of two agents and to reply to other kinds of messages via autoresponders. We sent a total of about 500 messages to each system — 250 requiring agent responses and 250 for autoresponses — in a three hour period.

We focused our evaluation on the products' architectures and on how well each product supports the people who manage messages that can be only partially automated.

Good today, better tomorrow

Today, organizations are realizing that they had better handle e-mail at least as well as they handle the telephone. At the same time, e-mail automation software vendors are trying to roll out complex applications with an array of new technologies, such as HTML content, advanced scripting and Java.

Expect to see this market evolve rapidly over the next couple years, which means you'll have to rethink your strategy at regular intervals as your customer base and the technologies driving the market evolve.

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e-business tools

Enlisting talent

Recruiting your next network employee from the military could be a good tactical maneuver.

BY LORETTA W. PRENCIPE

Jason Funderburk is making the transition from the Air Force to the business world in his new role as systems engineer at TEKsystems, a Dallas-based IT consulting firm.

Uncle Sam offered Airman Jason Funderburk an $11,032 bonus to re-up in the Air Force for another four years, but that wasn't enough to keep the network administrator at Little Rock Air Force Base in Jacksonville, Ark.

Last month, Funderburk left behind a salary and housing bonus of just under $26,000 to begin his first-ever civilian job as a systems engineer making upwards of $40,000 for TEKsystems, a Dallas IT consulting firm. He is one of the estimated 200,000 people who leave the military each year.

Many of these veterans have strong IT backgrounds and are qualified for positions in the private sector. Others are being tapped for training through the Microsoft Skills 2000 Military Initiative. Through this program, the U.S. Department of Labor, Microsoft and a consortium of other high-tech companies encourage departing military personnel to pursue civilian IT careers.

Officially launched in February, the initiative provides soldiers and their families with high-tech training loans, skills development and job placement services. During the 1998 pilot program, more than 1,500 U.S. service personnel received technical training in areas such as network administration.

On TAP

Two weeks before his separation date, Funderburk participated in a transition assistance program (TAP) at Little Rock Air Force Base's family service center. Such programs instruct participants in resume writing and interviewing, and lets them know about available jobs. The former airman advises hiring managers to pursue valuable speaking and recruiting opportunities at their local military bases.

Gus Sierkierka, vice president of human resources for IT services provider Computer Sciences (CSC) in Falls Church, Va., relies on departing service personnel to fill some of the company's open positions. CSC contacts potential employees at military bases and makes openings known by posting job listings to a number of defense organizations' Web sites. As a result, the firm gets a lot of resumes from military personnel.

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- Information about military transition assistance programs and related places where you can post job listings.

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Funderburk began his job search about six months before he was due to leave the military, but many companies wouldn't talk to him until a month before he left. The systems engineer advises hiring managers to take a long-term approach to recruiting departing inductees.

"Officially, separation starts about nine months before you leave," he says. "But unofficially, management starts asking what you plan on doing about two years beforehand."

In the Washington, D.C. area, recruiting military personnel before they join the civilian ranks is a regular practice. Jack Camm had no worries when he left the Air Force in July 1996 — a former squadron buddy had wooed him to join CSC, and Camm had the job lined up two months before his commission expired.

Camm, now a program manager for CSC in Springfield, Va., takes special interest in resumes he receives from former servicepeople, especially mid- to lower-level personnel. "The technical skills and training that people receive in the military are unmatched," Camm says.

Jeff Yauger, director of IS operations for IMI Systems in Melville, N.Y., agrees that those departing from the military are ripe for the picking. "The government has the world's largest IT infrastructure," says the 15-year Navy veteran.

During his stint as a network administrator at Norfolk Naval Base in Norfolk, Va., Yauger supported 800 Lotus Notes users on a Windows NT network. While this was solid experience, he lacked a TCP/IP background. "It's been trial by fire, but I've made it work," he says.

Yauger believes military experience transfers well to the IT industry because soldiers are disciplined and trained to pay attention to detail. "You don't do it twice. You do it right the first time," he says.

Pointing out that veterans have valuable leadership experience in a team environment, Camm says, "You can count on them to have the self-confidence and discipline to move in and make a contribution from Day One."

Reading between the lines

Go easy on soldiers' resumes, Yauger suggests. Translating military experience for the civilian sector isn't easy. For example, a resume that reads "duty section of 105 troops once every five days and kept ship online" really means, "managed 105 people and ship operations for a 24-hour period."

Funderburk initially had trouble writing his resume and says his first phone interview was a disaster.

"I was nervous. The interview only lasted eight minutes," he says.

However, he overcame those military-to-civilian transition difficulties with the help of a few friendly hiring managers, including his current boss.

Prencipe is a freelance writer and attorney in Springfield, Va. She can be reached at LWPrencipe@excite.com.

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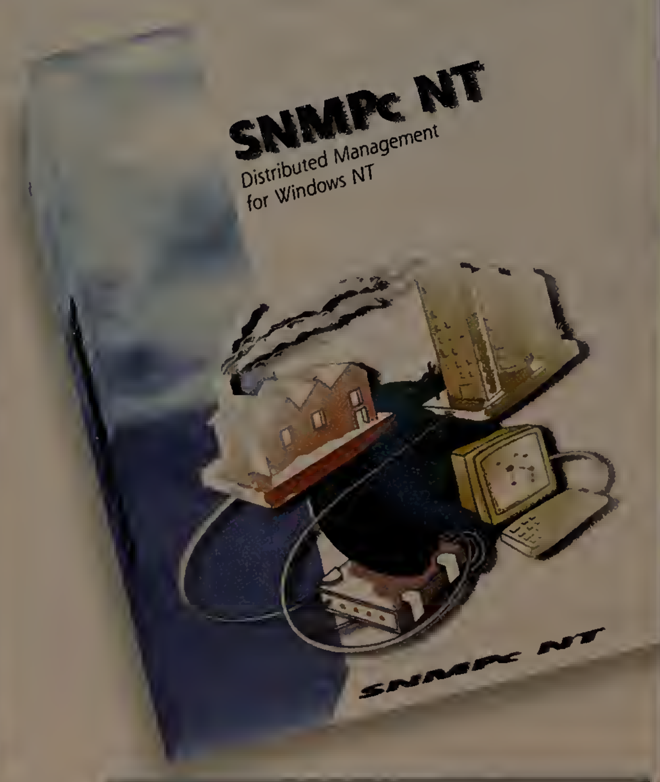

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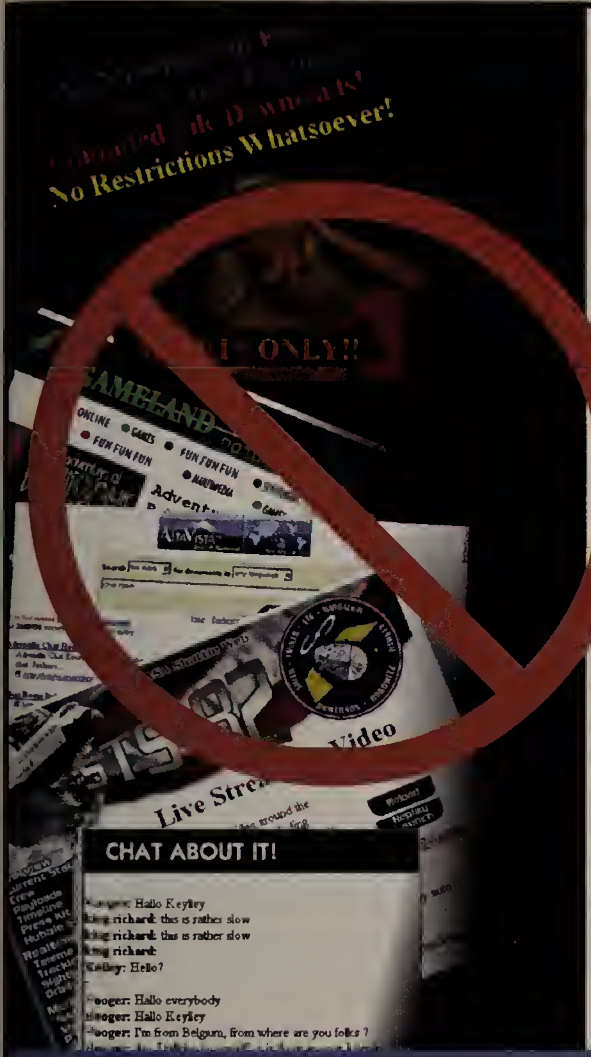
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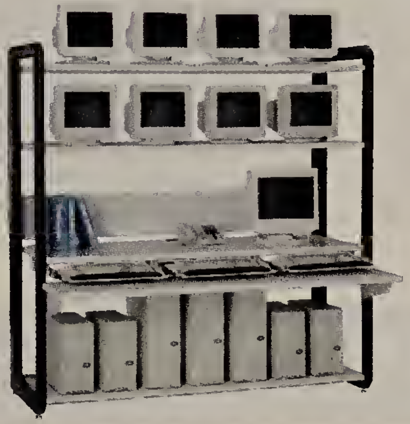

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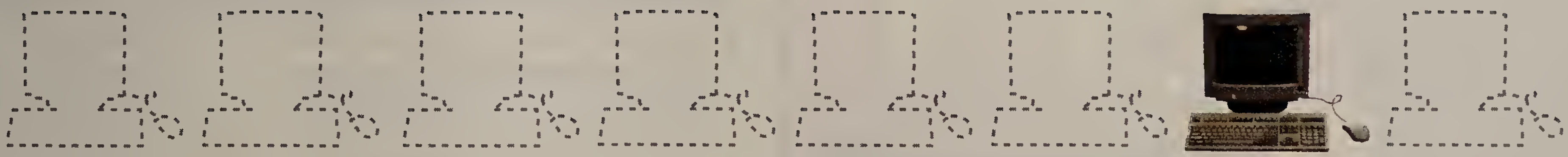

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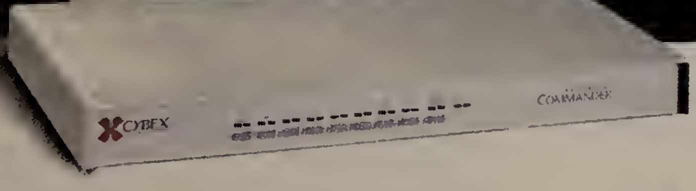

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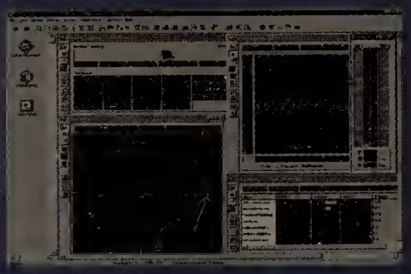

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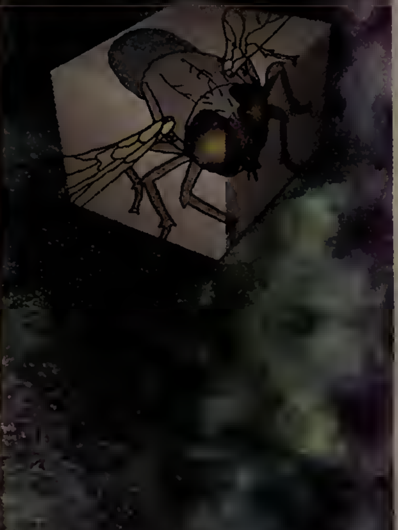

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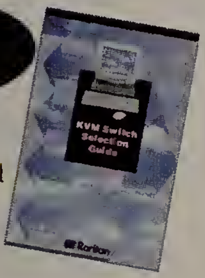

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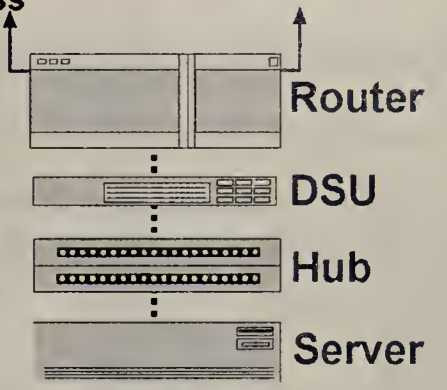

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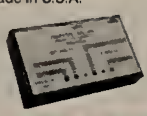

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Star Wars,

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than a nursery full of dancing babies (2M bytes per baby).

The official trailers are available at www.starwars.com, and rogue versions dot the Internet like so many Ewoks. According to the Apple Web site, which has permission to carry the trailers, more than six million copies have been downloaded.

While a random survey of e-mail administrators turned up no *Star Wars*-related service disruptions, a few have powered up their lightsabers to meet this foe head on.

"I'm a *Star Wars* junkie, and I know the number of science fiction fans we have here," says Julian Smith, vice president of IS at Thompson & Co., a Memphis advertising agency. "I knew this would be a problem, just like I knew everyone would try to download Internet Explorer 5.0 when it was released."

Smith posted a copy of the trailer on his company's intranet and let internal *Star Wars* fans know where to go to get their fix, thus "eliminating a waste of precious bandwidth."

One e-mail outsourcing company, AllegroNet of Dayton, Ohio, has seen an increasing number of trailers snagged by its MailZone filtering and virus-detection service. "We're talking about a huge file here," says AllegroNet executive Richard Bliss. "It's like a pig going through a boa constrictor."

"We've seen gluts of this type of stuff before, mainly from our student population."

Travis Berkley, supervisor of LAN support services, University of Kansas

MailZone was born in January as a countermeasure to similarly frivolous .avi and .exe files that had plagued AllegroNet customers during the holidays. Bliss reports that his customer base has grown from 200 to 800 companies in just three months.

There is clearly a heightened sense of awareness among IT professionals to these types of resource-sapping files. A *Star Wars* trailer "has already spread here," says David Byrkit, e-mail administrator at ITT Avionics in Clifton, N.J.

"With single-instance message store [on a Microsoft Exchange Server], mailbox limits and a good amount of horsepower, I'm not too concerned about it," Byrkit says. "It will probably increase our help desk calls for people who aren't used to exceeding their mailbox limit."

A certain battle-weariness has set in among those charged with keeping the e-mail flowing smoothly.

"We've seen gluts of this type of stuff before, mainly from our student population," says Travis Berkley, supervisor of LAN support services at the University of Kansas. "We got bitten only one time with a huge file blocking things up because we were low on disk space."

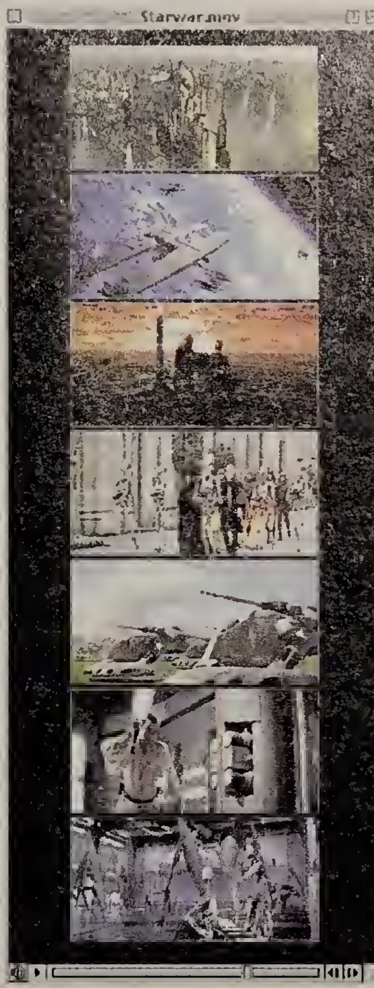
Berkley sees a solution in newer e-mail servers that allow administrators to nip these abuses in the bud.

"Many Simple Mail Transfer Protocol servers are now letting you limit the size of inbound messages, and some — such as [Novell's] GroupWise — let you limit it for certain users or groups of users," he says. "So target your 'problem children' and leave the legitimate users free and clear."

Some administrators, however, say they don't have the option of setting maximum file sizes for anyone.

"Due to the nature of our business [real estate investment], we can't limit the size of attachments," says Jim Santiago, assistant vice president of IS at AEW Capital Management in Boston. "The only thing we can do is to send reminders telling employees not to abuse the e-mail system."

The movie trailers may be a nuisance, but it could be worse. What happens, for example, if the sequel to this story turns out to be *Star Wars Meets Melissa*? "We all saw what happened with the Melissa situation," says Mike Dunn, e-mail administrator at Boston University. "If a monster file such as *Star Wars* had been attached, it would have complicated matters significantly." ◪



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At up to 25M bytes, the *Star Wars* trailers have e-mail administrators concerned about pass-along copies burdening their networks.

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QoS,

continued from page 1

The ability to deliver consistent QoS across different network media is vital to voice, data and video convergence because guaranteed service quality is the ultimate return on investment for convergence, observers say. If QoS fluctuates between different media types, the result is poor service that negates the other chief benefits of convergence: reduced equipment and service costs.

3Com's plan hinges on switch hardware that can map 802.1p Ethernet priority bits to one of four ATM QoS features — variable, constant, available or unspecified bit rate — at wire-speed, according to sources familiar with the company's work. This hardware is likely to manifest itself in the second half of 1999 as new ATM uplink and core switching modules for 3Com's SuperStack II wiring closet and CoreBuilder 3500 and 9000 backbone switches, sources say.

Sources also say 3Com is making claims that its ASICs can map 802.1p bits to ATM QoS in 150 nanoseconds, which will have negligible impact on switch performance.

3Com declined to comment.

Though 3Com's approach seems practical and straightforward, the proof will be in how easy it is to configure and enforce QoS policies across Ethernet and ATM, says Michael Speyer, an analyst at The Yankee Group in Boston. 3Com plans to enable enforcement through its Transcend management applications, sources say.

Users anticipate no snags in implementing 3Com's Ethernet-to-ATM QoS products.

"The implementation, as far as I can tell, is not going to be a big deal," says Gary Habermann, director of technical resources at Widener University in Chester, Pa. "This is a critical piece to get in place to finish the convergence effort."

Habermann says upgrading the hardware involved will likely be painless because it will be done at the end of Widener's switch life cycle.

3Com may not be the first to map 802.1p to ATM QoS. FORE says it is shipping ATM uplinks on its ESX-2400 and ESX-4800 switches that map 802.1p, IP type of service and other frame- and packet-based QoS techniques to ATM QoS.

"It's nice to hear that other vendors are beginning to implement some class-of-service mechanisms," says Steve Vogelsang, director of technical marketing at FORE. "We were feeling lonely," he says.

Widener University's Habermann isn't worried about implementing Ethernet-to-ATM QoS products.

Cisco can perform the 802.1p-to-ATM QoS mapping but prefers to work with Layer 3 techniques, such as Differentiated Services and other IP type-of-service bit manipulations, says Paul McNab, manager for systems architecture in Cisco's enterprise line of business. He claims this provides true end-to-end QoS that scales because Layer 3 QoS mechanisms apply to the WAN as well as the LAN.

Cisco is shipping technology that performs Ethernet-to-ATM QoS mapping at Layer 3, McNab says.

3Com chose 802.1p because it won't require expensive Layer 3 switches in wiring closets, sources say. Most Layer 2 switches support the 802.1p standard, and 3Com is a leading vendor of low-cost Layer 2 switches at the edge of LAN backbones.

3Com is proposing three distinct ways to implement the QoS mapping technique:

- At the desktop, using the company's network interface cards (NIC) and Dynamic Access policy software.
- In the Windows operating system, using Microsoft's Winsock II API.
- At the edge switch.

3Com NICs and Dynamic Access software will apply 802.1p tags to traffic after a workstation user signs on to a network and his access privileges are assigned from a policy server.

Winsock II will enable applications to natively signal their 802.1p priorities to the NIC without the intervention of additional software, such as Dynamic Access.

Setting QoS mapping policies at the switch will let network administrators override workstation-assigned QoS if higher-priority traffic requires the same switch port.

For switches that do not support 802.1p-to-ATM QoS mapping but do comply with the ATM Forum's LAN Emulation 2.0 specifications, 3Com will support the LANE User Network Interface 2.0 and User Network Interface 4.0 specifications for signaling QoS connections across an ATM backbone, sources say. This will ensure that traffic priorities are preserved to the destination edge in multivendor environments, they say. ◪

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Sequent SAN ties Unix and NT

BY DENI CONNOR

Sequent has overcome a long-standing SAN shortcoming by blending Unix with Windows NT in a storage-area network.

Although, Sequent officials declined to comment, sources report that the company's Windows NT/Unix SAN is already running at a large application service provider in the Midwest.

The NUMA-Q server will be able to share data with NT boxes.

Sequent counted on partners to help make its SAN plan a reality. Brocade Communications, Emulex, Clariion, Storagetek, Hitachi Data System and EMC are all helping to bring SAN capabilities to Sequent's NUMACenter and NUMA-Q servers. The Brocade SilkWorm switch is already built into both server lines.

NUMACenter is a mixed Intel-based Windows NT/Unix server that lets NT work as an application server and run front-end applications along with Unix back-end applications, such as Oracle.

NUMACenter allows simultaneous use of Sequent's Unix, dubbed DYNIX/PTX, and Windows NT on the same machine, so customers can use the operating system that best matches their applications and consolidates servers. The server also supports host mainframe-type MVS applications.

NUMA-Q is a Unix-only system for large, data center operations.

Under the Sequent plan, storage devices will attach to the server through the Brocade SilkWorm Fibre Channel switch and the Emulex host bus adapter (HBA), the LP7000E.

By working with Brocade, EMC and Emulex, Sequent can provide zoning to dedicate separate sections of the SAN for each operating system.

Lucent, a heavy-duty Sequent user, looks forward to the integration. "We presently use the Fibre Channel switching extensively to provide redundant disk and memory paths through Sequent's NUMA-Q server," says Doug Kroupa, chief technology officer for Lucent's Public Safety System. "The applications we use require mission-critical access — they monitor and manage 911 systems across the nation."

Lucent maintains 30 servers across the U.S. and is looking at Windows NT for its operations. "We are evolving into more graphical Windows NT interfaces and browsing and want to run Windows NT servers into these locations," Kroupa says.

The lack of interoperability among different vendors' devices and network operating systems is one of the main inhibitors to the adoption of SANs. "The move toward heterogeneity is welcome by any server or storage vendor," says Dave Hill, an analyst at Aberdeen Group. However, no company has yet offered an open interoperable architecture that allows any server running any operating system to access any storage system, Hill points out.

EMC Symmetrix storage, for instance, will operate with a variety of operating systems and equipment but not with other storage devices.

Sequent plans to keep working on interoperability. When the technology is complete, Sequent will support IBM's FICON, which replaces ESCON and allows mainframe computers to link via Fibre Channel to the SAN.

Sequent is also working on long-distance access to the Fibre Channel SAN over ATM, and will deliver products later this year. Fibre Channel can link remote sites less than 10 kilometers away from one another via switch cascading. ◪

LAN,

continued from page 1

their existing LAN gear.

By jumping to Gigabit Ethernet, the regional Bell operating companies are trying to one-up AT&T, which recently announced its Transparent LAN Service, which gives users LAN-speed ports into its ATM network. But that service offers slower LAN connections of 10M bit/sec Ethernet, 100M bit/sec Fast Ethernet and 4/16M bit/sec token ring (*NW,* March 29, page 8).

Using token ring, Ethernet, Fast Ethernet and FDDI in the WAN is not new. Carriers have been offering those protocols for about five years in transparent LAN services. Typically those services ran over dedicated fiber rings to customer sites.

Because native LAN protocols, including Gigabit Ethernet, over fiber peter out within 62 miles or so, some users may find transparent LAN services limiting. But transparent LAN services are ideal for linking LANs that are clustered just a few kilometers apart in the same metropolitan area.

Pricing can be ideal, too. Current transparent LAN offerings range from $750 per month to $2,000 per month for each site. Those prices vary depending on service provider, bandwidth and mileage.

That can mean big savings, according to Tim Martin, assistant systems administrator for Ohio's Department of Taxation. The department's four-site 16M bit/sec token-ring ALIS service from Ameritech costs about $5,000 per month, he says. That is about one-fifth of the next least expensive alternative: DS-3 links to each site for the same amount of bandwidth, he says.

In Jacksonville, Fla., Baptist/St. Vincent's Health System uses BellSouth's 10M bit/sec Ethernet Native Mode LAN Interconnect service to tie together 50 sites. The price of that 10M bit/sec connection is less than the cost of three T-1s, which would give only 4.5M bit/sec, says Mac Jackson, director of network management for Baptist/St. Vincent's Health System.

Some of his sites could have gotten by with less than the 10M bit/sec service, but he wanted to keep the network simple. "It didn't make sense to mix and match," Jackson says.

It's ATM under the covers

While Gigabit Ethernet services are the flashiest advance in services, carriers are making other improvements to transparent LAN offerings. Many of those changes have to do with giving customers the option of bringing their LAN traffic to the carriers' ATM backbone. From there the carrier can offer priority delivery of data, and can interconnect LANs at greater distances than native LAN protocols would allow.

Within 90 days, GTE plans to introduce ATM Lite. The service will link sites via ATM, but without some of the features ATM is capable of, such as virtual circuits or priorities for different traffic. This is because ATM Lite will use less-expensive ATM access switches to shuttle traffic around a fiber-optic ring rather than core ATM switches.

US WEST is trying to move its transparent LAN services to LAN Switching Services (LSS), which use an ATM backbone. This fall, US WEST will offer a new service designed to promote the shift. The new service, called LSS to ATM service interworking, will allow sites connected by data-only transparent LAN service to tie into a site that is connected to the US WEST network by an ATM pipe.

The ATM connection will not only be able to handle the transparent LAN data traffic, but voice as well.

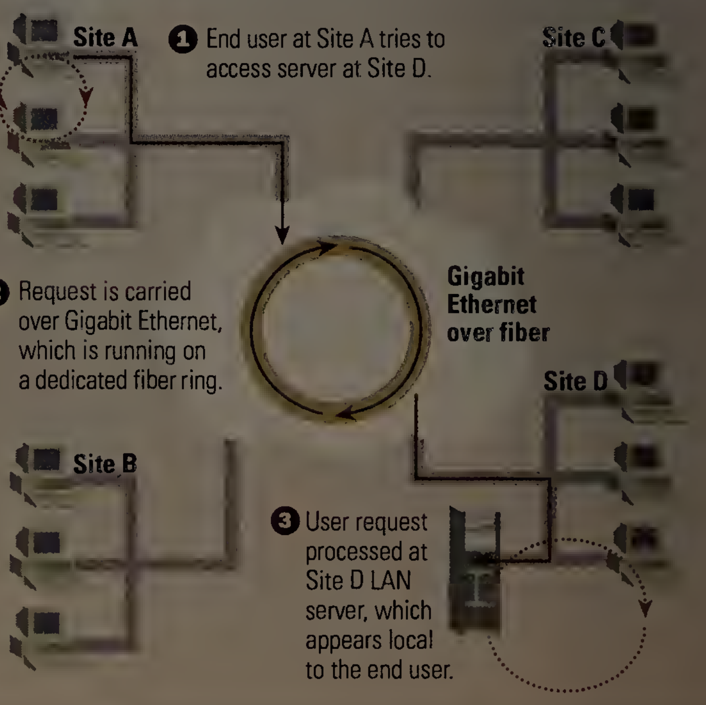
Bell Atlantic has plans for a similar service. "We will interconnect transparent LAN with ATM so we can connect any network to any network," says Oscar Mujica, Bell Atlantic enterprise business manager.

BellSouth is just testing a service called Inter-Metro Access Link (IMAC) that uses ATM to connect separate transparent LANs located in nearby cities.

And SBC already provisions its Native LAN+ service using an ATM network.

When the WAN feels like a LAN

With Gigabit Ethernet WAN services, LANs located at different sites will seem to be connected.


Site A
① End user at Site A tries to access server at Site D.
Site C
② Request is carried over Gigabit Ethernet, which is running on a dedicated fiber ring.
Gigabit Ethernet over fiber
Site D
Site B
③ User request processed at Site D LAN server, which appears local to the end user.

Introducing ATM into transparent LAN services makes sense to the Ohio tax department's Martin. When the department starts letting taxpayers file returns electronically, traffic on the network will increase geometrically, Martin projects. He is already eyeing 155M bit/sec OC-3 ATM to replace his current LAN service. ◪

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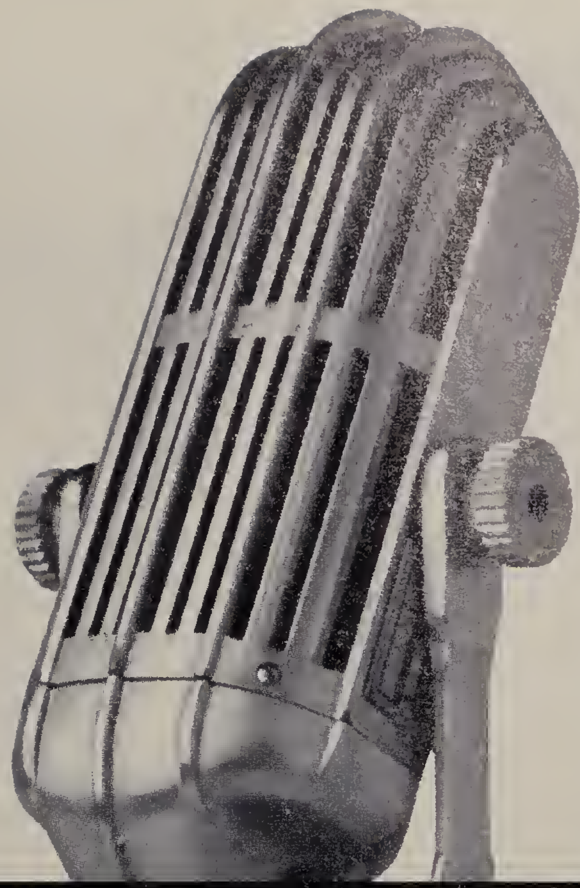

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The Scoop

The news behind the news

WHY ETHERNET SWITCHES ARE SO DARN CHEAP

Lucent's target price of less than $100 per port on its upcoming 10/100M bit/sec switches brings the company in line with the Ethernet price freefall in the industry over the past few years.

Several factors have combined to make Ethernet switches at Layer 2 and Layer 3 less expensive. The triumph of Ethernet over other LAN technologies, advancements in Application Specific Integrated Circuits (ASIC) and intense competition are transforming these switches into commodities.

As a result, Ethernet switch prices have dropped from $650 per port in 1996 to less than $100 per port. Nortel Networks sells its popular BayStack 350T for $104 per port, while 3Com is offering switches at $69 per port (*NW*, Feb. 22, page 19). Switches with Layer 3 functions are now priced at about $300 to $400 per port.

The majority of all LAN ports shipping are Ethernet, so vendors are able to decrease their costs due to economies of scale. The size of the market is drawing in companies that thrive in commodity markets, such as Hewlett-Packard and Samsung.

Even as users move from the old standby, 10M bit/sec Ethernet, to Fast Ethernet at 100M bit/sec and Gigabit Ethernet, the core technology remains a known quantity. Engineers know how to build Ethernet gear and have been doing it for years. Ethernet switch components are widely available at low prices, which makes development times shorter and products less expensive.

The fact that many enterprises are standardizing on IP at the network layer also reduces costs. IP routing functions can be baked into ASICs, which are fast and inexpensive (*NW*, Dec. 7, 1998, page 1). IP is another known quantity, so the inflexibility of ASICs isn't much of an issue. And because IP is so widely used, engineers at network equipment vendors can focus on that one protocol, avoiding work on most other routing protocols.

Falling 10/100M bit/sec Ethernet prices are putting pressure on Gigabit Ethernet prices, as well. But the real breakthrough in Gigabit Ethernet pricing may come when products using 10Base-T copper wiring arrive in coming months. Though Gigabit Ethernet over copper is more difficult to develop than Gigabit Ethernet over fiber-optic lines, vendors are looking to set prices for copper-based switch ports at 25% less than their fiber counterparts, which sell for about $1,200 today.

— Jeff Caruso

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USPS735-730

Lucent,

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maximum of 384 Ethernet connections. The box is designed to keep up with big next-generation routing switches, such as the Cisco Catalyst 8540 and Nortel's recently unveiled Accelar 8000.

The six-slot P660 is based on the same chassis as Lucent's current flagship P550 multilayer Ethernet switch. The box also will feature 24-port cards for up to 144 10/100M bit/sec Ethernet connections.

The P660 and P880 also will feature Gigabit Ethernet modules that can connect the switches and aggregate Ethernet connections with fiber backbones. The modules reportedly support four to eight Gigabit Ethernet ports per card, with the P880 supporting a maximum of 64 Gigabit Ethernet ports and the P660 handling up to 24 Gigabit Ethernet links.

Ed Packer, manager of network services for Cirent Semiconductor in Orlando, says he's intrigued by the higher port density of the P660. "Any time you have greater port density, that's a good thing," he says, citing the multiplying number of boxes at his facility.

Packer, who currently has 50 P550 Layer 2/Layer 3 switches installed, says the P880 will feature a 135G bit/sec backplane. The 46G bit/sec P550 currently maxes out at 120 Layer 2 ports or 72 Layer 3 ports.

Under Lucent's overhaul plan, code-named Cajun II, the P550 will receive hardware and software upgrades. For example, Lucent is considering a new 48-port 10/100M bit/sec Ethernet module for the P550 with a target price of less than $100 per port, according to an internal Lucent document obtained by *Network World*. That document also confirms plans for the two bigger switches.

The P880 leapfrogs Nortel's Accelar 8000 and Cisco's Catalyst 8540 multilayer routing switch in terms of the number of available payload slots — 17 for Lucent compared with 13 for Cisco and 10 for Nortel. But otherwise, many of the P880 features match those of big multilayer switches already shipping from these two vendors, as well as those from 3Com, Foundry and others.

For example, the P660 and P880, and possibly the new software release for the P550, will support the 802.1p QoS standard.

But for Lucent, building a following by adding features similar to those offered by competitors will be tough, according to Dell'Oro Group, a market research firm in Portola Valley, Calif. That's because Lucent only holds a 2.1% market share in Layer 3 switched Ethernet sales, Dell'Oro Group says.

Lucent is expected to try to compete on cost. In one indication of its pricing strategy, Lucent last week relaunched another product, the Cajun M770, as a combination ATM and Ethernet switch using dual-domain cell and frame switch fabrics, supporting up to 105 OC-3 ports for each protocol.

Lucent is positioning the M770, originally announced in October 1998, as its first true enterprise ATM switch. The box is priced as low as $29,000 for its minimum configuration of 15 OC-3 ports. The M770 supports features similar to those supported by FORE Systems' ASX-4000 ATM switch, but Lucent's price is half that of FORE's, says John Morency, director of network business practice for Renaissance Worldwide, a consulting firm in Boston. "This is one vendor that's finally giving FORE a run for its money in the ATM backbone," Morency says.

Lucent may have little choice but to push aggressively on per-port pricing for its Cajun line of LAN switches because of its lack of installed base and falling market prices (see The Scoop, this page).

Cajun — Lucent's brand name for Ethernet and ATM switching products for the campus — is derived from one of Lucent's data acquisitions, former Gigabit Ethernet start-up Prominet Corp. Right now Cajun switches are among the most expensive in the market. For the fourth quarter of 1998, Dataquest estimates Lucent's revenue in this area at $1,955 per port, higher than Cisco's $1,377 per port and Nortel's $1,891 per port.

This gives Lucent an 8% revenue chunk of the Gigabit Ethernet switch market, Dataquest says. "The Prominet box was a first-generation [Gigabit] Ethernet switch, but the world has moved beyond that," says Michael Speyer, associate director of network solutions at The Yankee Group in Boston. "If they're going to continue to play in the core of the enterprise, they're going to have to have a much bigger box."

Early Lucent users say much depends on their own applications.

For example, California Institute of Technology in Pasadena links hundreds of PCs through P550 switches, binding the PCs to act as a supercomputer. The next generation of that supercomputer will use the latest processors, so Caltech will need switches that can provide higher bandwidth, says Thomas Sterling, principal scientist at Caltech. ◪

Sizing up the players

Lucent's planned multilayer campus switch would stand up to the other two internetwork giants' offerings.

Product	Slots	Backplane speed	Forwarding rate	ATM support?	10/100M bit/sec ports	Gigabit Ethernet ports
Cisco Catalyst 8540	13	40G bit/sec	24 million packet/sec	Yes	Up to 128	16
Nortel Networks Accelar 8000	10	50G to 256G bit/sec	200 million packet/sec	Yes	Between 240 and 384	100
Lucent Cajun P880	17	135G bit/sec	96 million packet/sec	Yes	Up to 384	64

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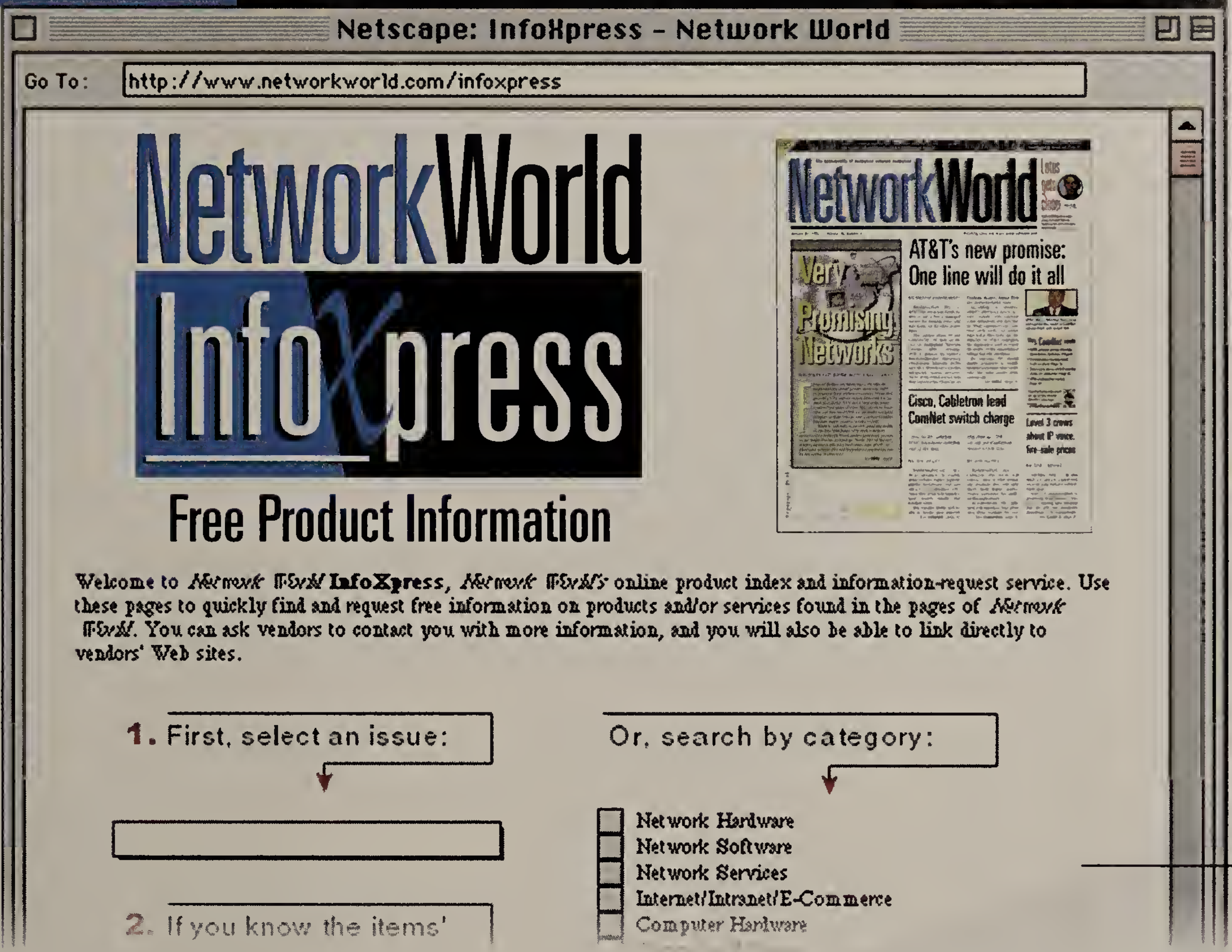
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Backspin

Is Intel headed for Jerry Springer?

> *"While I'm willing to admit that the program has a prurient appeal, the attraction wears thin quickly. The 'guests' are more like bad actors than real people, making* The Jerry Springer Show *seem like the WWF of talk shows."*
>
> **— James Berardinelli, film critic**

MARK GIBBS

Like Mr. Berardinelli, I must confess finding a certain creepy, prurient appeal in *The Jerry Springer Show*. After all, where else would you find a drunken monopede dwarf confessing his love for lederhosen or be able to watch a rejected striptease artiste begging her ex-boyfriend, a cross-dressing truck driver, to take her back?

Now what has this to do with networking? Well, Intel is acting so oddly that I suspect that an appearance on *Springer* can't be far off.

If you go to Intel's Web site you'll find (assuming the company doesn't change anything before you read this) a link to something called WebOutfitter.

WebOutfitter is described by Intel as providing "access to cutting-edge Web sites, tools and tips that enhance your Internet experience with a Pentium III processor."

Note that little qualification: "with a Pentium III processor." If you want to access WebOutfitter content you must be running a Pentium III. Why? Only the gods and people with a Pentium III know. When you click on the link, Intel requires that you download and execute a utility that tests if you have a Pentium III. If not, it dumps you on a page that pitches the benefits of Pentium III ownership.

There's also the interesting restriction that you must be running Windows 98. My guess is that Intel doesn't have software to run the test on other operating systems, so if you have a Pentium III but you're running Windows 95, NT, Macintosh or Linux, forget it.

<digression>How I loathe the term "cutting-edge"! It is one of those examples of marketingspeak that screams "hype" as soon as you hear it. I'm looking for examples of hype in vendor copy, so wing 'em my way.</digression>

On one of its Web pages, titled "Software and Sites for Home," Intel may be tipping its hand regarding the content of WebOutfitter, because it lists software and Web sites that "make the most of your Pentium III processor-based PC."

It cites the likes of Battlezone and Photo Express and implies that the Pentium III makes these somehow better. How does the Pentium III make Battlezone better than running it on, say, a Pentium II? Or an AMD chip for that matter? I mean, in real terms.

Then there are the Web sites that are supposedly improved by the Pentium III. These sites include the likes of AutoByTel, Bloomberg, CNET, Scoreboard and eToys. According to Intel, I can "shop online in more convenient and informed ways" and "surf and explore the Web in natural, intuitive ways" through the performance and power of the Pentium III. What crap.

With the whole WebOutfitter gig, Intel appears to be attempting to Balkanize users as a marketing tactic — a strange way of dealing with a commodity market.

As Rich Wiggins, an Internet author who also works as a technologist at Michigan State, commented in a posting to a private e-mail list recently, "It seems to me that that approach is exactly backwards. No one will be motivated to buy a Pentium III to see that content. Far better to give me the content and the tools, see how slow the tools are on my 'ancient' Pentium (or AMD) system, and decide to upgrade."

If *Springer* ever does a show on "marketing groups that don't get it," or "monopolists that can't restrain their power," Intel will be an ideal guest.

Bizarre guests to nwcolumn@gibbs.com or (800) 622-1108, Ext. 7504.

'NET BUZZ

PAUL MCNAMARA

Here's one way to tell when an Internet niche has taken root: Lawyers start spreading the fertilizer.

Tumbleweed Software and docSpace compete for business customers who want to ship big, fat documents across the Internet instead of via an overnight service or one of those spandex-clad bicycle jockeys who terrorizes pedestrians. Tumbleweed recently accused docSpace of patent infringement. DocSpace's response: "Patent this."

Here's one way to tell that a market has legs: Listen for the wolf whistles of imitators.

Click2send.com, Inc., a start-up in Los Altos, Calif., will crash the Tumbleweed-docSpace party next week when it launches an advertiser-supported (and therefore free to you) file delivery and storage service called — you guessed it — click2send.

"We want users to have the easiest experience possible in transferring files," says **David Knight**, a click2send co-founder.

The company also wants eyeballs glued to PCs as customers upload porky PowerPoint presentations — or a 15M-byte *Star Wars* trailer — to a "digital safe deposit box" on the click2send site. Recipients receive a URL via e-mail to alert them of delivery, saving the sender bandwidth or shipping costs. Instead of easily ignored banner ads, click2send users will see an animated "billboard" ad taking up most of their screen during the, say, two minutes it might take to upload a 20M-byte file over an office T-1 line.

An idiot/executive-proof user interface, 120M bytes per box for up to 10 days at a time, and an Internet-friendly price — zippo — will help squash any qualms about ads in the workplace, Knight insists.

Does click2send have a winner? Can't say . . . at least not until the company has been sued.

Everybody knows that any chucklehead with a crumb of an idea and a half-baked business plan can get venture funding these days as long as he dots all his dot.coms. Right?

Don't be silly, says **Jim Breyer**, managing partner at Accel Partners in Palo Alto. His team sees about 10,000 business plans annually, and last year funded 20.

"It's harder than ever to raise money," Breyer says.

You can bet that is no longer a concern at RealNetworks. The New York Yankees of streaming media cut its teeth on Accel cash back in 1995. Last week, RealNetworks was the talk of merger mongers everywhere after its stock soared on the updraft from Yahoo's grab of Broadcast.com. Breyer is on the RealNetworks board, so he is well-positioned to give us the inside scoop. . . . Too bad he knows better.

RealNetworks is convinced that staying a solo act remains its best strategy, Breyer insists. **CEO Rob Glaser** has been singing the same tune to the press.

These guys may even believe it. Well, they probably do. OK, full benefit of the doubt here: They believe it.

They will also change their minds. Broadcast.com found $5.6 billion worth of reasons to give up the ghost. There is a check out there with enough zeroes on it to get RealNetworks properly hitched.

Glaser is no chucklehead.

Are you worried sick about losing your privacy on the Web? Stop. Worry instead about Washington trying to "fix" the problem.

U.S. Rep. Ed Markey (D-Mass.), the shameless self-promoter who brought us that silly television V-chip, has made it known that he intends to shield the helpless Web citizenry from digital prying eyes.

Having interviewed Markey several times in my previous life as a daily community newspaper editor, I can honestly say I'd rather see a hackers' convention in my study than this politician messing with the 'Net.

McNamara did not win the $197 million lottery jackpot in Massachusetts last week, so he's still depending on your Internet-related news tips to put food on the table. Give generously at (508) 820-7471 or pmcnamara@nww.com.

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